


IN EIGHT VOLUMES

X-201



Digitized by the Internet Archive
in 2023 with funding from
Kahle/Austin Foundation

THE HARMSWORTH ENCYCLOPÆDIA

Everybody's Book of Reference

*Containing 50,000 Articles,
profusely illustrated*

Vol. V. Hosanna—Marjoram.

LONDON :

THE AMALGAMATED PRESS, LTD., CARMELITE HOUSE, E.C.
AND
THOMAS NELSON AND SONS, 35 PATERNOSTER ROW, E.C.

LIST OF CONTRACTIONS USED IN THIS WORK.

ac., acres.
 agric., agricultural.
 alt., altitude.
 anc., ancient.
 ann., annual.
 Ar., Arabic.
 Aram., Aramaic.
 arr., arrondissement.
 A.S., Anglo-Saxon.
 A.V., Authorized Version.
 aver., average.
 bor., borough.
 b.p., boiling-point.
 bur., burgh.
 C., Centigrade.
 c. (circa), about.
 cap., capital.
 cf., compare.
 co., county; in Hungary, comitat.
 Com., Commission.
 comm., commune.
 cub. ft., cubic feet.
 Dan., Danish.
 dep., department.
 dist., district.
 div., division.
 Du., Dutch.
 E., east.
 eccles., ecclesiastical.
 ed., edition; edited.
 e.g., for example.
 Eng., English.
 episc., episcopal.
 et seq., and the following.
 F., Fahrenheit.
 fort. tn., fortified town.

Fr., French.
 ft., feet.
 Ger., German.
 gov., government.
 Gr., Greek.
 Heb., Hebrew.
 I. isl., island.
 ibid., the same.
 i.e., that is.
 in., inches.
 Ital., Italian.
 Lat., Latin.
 lat., latitude.
 l. bk., left bank.
 lit., literally.
 long., longitude.
 m., miles.
 m.p., melting-point.
 mrkt. tn., market-town.
 Mt., mts., mount, mountain, -s.
 munic., municipal.
 N., north.
 N.T., New Testament.
 O.T., Old Testament.
 par., parish.
 parl., parliamentary.
 Per., Persian.
 pop., population.
 Port., Portuguese.
 prov., province.
 q.v., which see.
 R., riv., river.
 r. bk., right bank.
 R.V., Revised Version.
 ry., railway.
 ry. jn., railway junction.

S., south.
 Sans., Sanskrit.
 seapt., seaport.
 Slav., Slavonic.
 Span., Spanish.
 sp. gr., specific gravity.
 sq. m., square miles.
 stn., station.
 s.v., under the word.
 Syr., Syriac.
 temp., temperature.
 terr., territory.
 tn., town.
 trans., translated.
 trib., tributary.
 U.S.A., United States of America.
 vill., village.
 vol., volume.
 W., west.
 wat.-pl., watering-place.
 yds., yards.
 Railways—C.R., Caledonian Railway;
 C.P.R., Canadian Pacific Railway;
 G.E.R., Great Eastern Railway;
 G. & S.W.R., Glasgow and South-
 Western Railway; L. & N.W.R.,
 London and North-Western Rail-
 way; N.B.R., North British Rail-
 way, etc., etc.
 Bibliography—Biog. Dict., Biograph-
 ical Dictionary; Encyc. Brit.,
 Encyclopædia Britannica; Proc.
 Royal Geog. Soc., Proceedings of
 the Royal Geographical Society;
 Jour., Journal; Hist., History;
 Mag., Magazine, etc., etc.

THE HARMSWORTH ENCYCLOPÆDIA.

VOL. V.

Hosanna, an exclamation of praise used by the multitude when Jesus made his triumphal entry into Jerusalem (Mark 11:9, 10).

Hosea, the first in order of the twelve minor prophets, and among the earliest of all the prophets to commit his discourses to writing. He was a native of the north kingdom, and prophesied in the reigns of Jeroboam II. and his successors—i.e. from about the middle of the 8th century B.C. His prophecies fall into two parts: (1) ch. 1-3, in which he recounts the tragedy of his marriage, and uses it to illustrate the relations between Jehovah and His unfaithful people; (2) ch. 4-14, in which he sets forth more fully the infidelity of Israel, as shown in its idolatry, its internal corruptions, its dalliance with other nations; threatens it with the severest penalties, and yet promises deliverance and restoration, if it but repent. There has been much controversy regarding the marriage of Hosea, the problem being whether it was a real experience or only a parable. The literary style of Hosea is concise even to abruptness—Jerome called it *commaticus*—but highly poetical, lit up with telling images, and suffused with intense feeling. In his human-like conception of God's love to His chosen people he all but presages the Christian view of the fatherhood of God. See commentaries by Nowack (1880) and Loftman (Swedish, 1896); Cheyne in *Cambridge Bible* (1884); G. A. Smith in *Expositor's Bible* ('The Twelve Prophets').

Hoshangabad, chief tn. of Hoshangabad dist., Central Provinces, India, situated on l. bk. of the Nerbada, 40 m. S.E. of Bhopal. Pop. (1901) 14,940. The district has an area of 4,594 sq. m., and a pop. (1901) of 449,165. In the famines of 1896-7 and 1900 the district suffered severely.

Hoshiarpur, cap. of Hoshiarpur dist., Punjab, India, 62 m. E.

of Amritsar. There are cotton, lacquer, wood, and copper industries. Pop. (1901) 17,549. The district has an area of 2,244 sq. m., and a pop. (1901) of 989,782.

Hosiery. See KNITTING.

Hoskins, Sir Anthony Hiley (1828-1901), British admiral, took part in the capture of Canton and the Taku forts (1857) in China; served as rear-admiral in the Egyptian war (1882); and was commander-in-chief of Mediterranean station (1889-91), and thrice a lord of the Admiralty.

Hosmer, Harriet G. (1830), American sculptor, born at Watertown, Massachusetts, U.S.A., learned her art under the sculptor Gibson at Rome. Her works show powerful conception and execution. *Puck, Zenobia in Chains, Beatrice Cenci, A Sleeping Faun* (1867), and *A Waking Faun* are among her best.

Hospice, a monastic house of shelter for the relief of travellers passing over the Alps. The Hospice of the Great St. Bernard was founded in 962. An establishment of similar character existed from the 13th century on Mt. St. Gothard, and there are similar hospices on Mt. Cenis, the Simplon, and the Little St. Bernard.

Hospitalet, tn., prov. Barcelona, Spain, 3 m. from S. Fello de Llobregat. Pop. (1900) 4,948.

Hospital Fund, KING EDWARD'S. See HOSPITALS.

Hospitallers, Knights' Hospitalers, Knights of the Holy Sepulchre, or Knights of St. John of Jerusalem, afterwards Knights of Cyprus, then of Rhodes, and lastly of Malta, had their origin in Palestine in the middle of the 11th century, their aim being to succour and protect Christian pilgrims visiting the Holy Sepulchre. Certain Italian merchants of Amalfi had previously erected in Jerusalem a Benedictine chapel and two hospices. Upon this foundation there soon arose a great organi-

zation, pre-eminently military in its character, although continuing to be professedly religious. The European occupation of Jerusalem (1099) after the first crusade greatly modified and enlarged the scheme of the community of St. John's. At this time it received papal recognition, exemption from tithes and from all episcopal jurisdiction, together with many privileges from the kings of Jerusalem—in short, became a complete autonomy. Lands and lordships in W. Europe, as well as in the Holy Land, were bestowed upon the hospital by crusading princes and nobles. After the death of the first rector, Gerard, in 1118, his successor, Raymond Dupuy, a French noble, proceeded to cast the organization in that military mould which distinctively characterized it, constituting three grades—the knights, who formed a fighting force for the defence of the Latin kingdom of Jerusalem against the Saracens; the chaplains, whose duty it was to continue the religious traditions of the order; and the serving brethren, who performed menial work. All these took the vows and wore the dress of the order (a black robe and cowl, with a white cross of eight points upon the left breast). The chief power was vested in the rector, or 'grand master,' who ruled as president of the council; and this body appointed certain knights of the fraternity, under the name of 'preceptors,' to administer the affairs of the hospital in those European countries in which it had possessions and convents, or 'commanderies.' At one time the order possessed no less than nineteen thousand manors in different parts of Europe. These belonged to one or other of the seven 'nations' or 'languages' of Provence, Auvergne, France, Italy, Aragon, Germany, and England (which last included Scotland). Their position in

England is fully described in the Camden Society's account of 1855 (printed 1857).

Like their contemporaries and congeners the Templars, the Hospitallers possessed many strong castles in Syria, and on the suppression of the Templars in 1312 their lands were mostly transferred by the Pope to the Hospitallers.

In 1291, owing to the reconquest of the Holy Land by the Saracens, the headquarters of the Hospitallers were moved to Limasol in Cyprus. In 1310, under the Grand Master Villaret, they captured the island of Rhodes, where they settled, becoming known therefrom as 'Knights of Rhodes.' They remained masters of Rhodes until 1523, when, after a very long and stubborn siege, they were obliged to capitulate to the Turks. As an *imperium in imperio* they were always greatly disliked by the sovereigns of W. Europe, who were also envious of their wealth and power, and after their departure from Rhodes their influence materially declined. In 1530 their property in England was confiscated by Henry VIII.; and in the same year the order found an asylum in Malta, which was ceded to them by Charles V., Holy Roman Emperor, and continued in their possession until it was seized by Napoleon in 1798. Two years later the island was occupied by the British. In 1879 the headquarters of the order were fixed at Rome, and since that date the members have entered into hospital service under the Convention of Geneva. They have business offices near St. John's Gate, London, and in other capitals.

See Vertot's *Histoire des Chevaliers Hospitaliers de S. Jean de Jérusalem* (Paris, 1761; Eng. trans. 1770); Boisselin de Kerdu's *Ancient and Modern Malta* (3 vols. 1804); Larking and Kemble's *Knights Hospitallers in England* (Camden Society, 1857); Prutz's *Besitzungen des Deutschen Ordens im Heiligen Lande* (1877); Woodhouse's *Military Religious Orders of the Middle Ages* (1879); Bedford's *Malta and the Knights Hospitallers* (1894); Le Roux's *Les Hospitaliers* (1904), which contains a full bibliography.

Hospitals. The earliest Christian examples of what we now understand by hospitals were the hospitalia of the Knights Templars and Knights of St. John in Jerusalem and other places in the Holy Land in the crusading era; but the earliest known hospitals for disease, other than Christian, were founded by Buddhist priests in India. A century ago the death-rate of some maternity hospitals was nearly fifty per cent., and that of surgical

wards was scarcely better. It was the very enormity of the figures that led Lister to deduce the nature of the poison which lurked about the hospitals of those days. Until his time the buildings, the beds, the soil, and the air itself were saturated with the germs of disease. The method of construction of hospitals was such that they became plague spots, whence pestilence and death were spread abroad. Lord Lister changed all that. The ideal hospital of to-day would be a village of one-story cottages; each in its own large plot of ground, and each built in strictest accord with hygienic principles regarding light, heat, ventilation, water supply, and drainage. Centrally in the village would be medical quarters and accommodation for nurses, as well as culinary, drug, and laundry departments. The whole hospital would stand in open country, remote from neighbours and from anything except its own farm and its own railway station. But in great cities accidents from thronged streets, from crowded factories, and from reeking slums, call for hospitals in their midst, and the problem is how to utilize best a necessarily restricted site. The site ought to be the largest and driest available; and since city land is valuable, in place of isolated one-story cottages wards are piled one above the other, each being accessible only by an outside stair. Such a building is known as a pavilion; and a collection of these may be united by covered passages. For a general hospital, about 130 sq. ft. of floor space, 1,665 cub. ft. of air, and 27 sq. ft. of window space should, if possible, be allotted to each bed. In hospitals for the reception of infectious cases, 156 sq. ft. of floor space and 2,500 cub. ft. of air should be allowed for each patient; while in small-pox wards it is desirable to have even larger areas. In all hospitals the pavilions should be above the ground level, so that there is free circulation of air beneath, and they should be widely separated from each other. In the wards all angles and recesses in which dust may accumulate must be avoided, and light should be admitted on as many sides as possible. The most suitable flooring material is hard wood of a close grain, and it should be polished; the walls ought to be glazed or covered with a non-porous paint. Ward furniture and beds should be as simple as possible, ornamentation being everywhere sacrificed to the necessity for scrupulous cleanliness. Within easy reach of surgical wards must be operating theatres, so constructed that they can be rendered practically germ-free. During the

first years of Listerism surgeons aimed at antiseptic surgery, or combating germs which find a resting-place on a wounded surface or gain an entrance into living tissues. More modern surgeons employ aseptic methods, which go a step further, and attempt to shut germs altogether out of the area where an operation is performed or a wound is dressed. Revolutionary changes have taken place in the *personnel* of hospitals. Clean, educated gentlewomen have taken the place of the (surgically) dirty and illiterate Sarah Gamps of the past, and the nursing staff has been greatly increased in numbers as well as in efficiency. See Burdett's *Hospitals and Asylums of the World* (1891-2), and *The Cottage Hospital* (1901).

General Hospitals are supported by private charity, and they are intended for the reception of those only who cannot afford treatment at their own homes. General hospitals are usually divided into a medical and a surgical side. The larger institutions have accommodation for various special departments, such as wards for eye, skin, or throat disease. Some have, in addition, a maternity branch.

Fever Hospitals are devoted to the isolation and treatment of infectious cases, and as they may be built by order of the local sanitary authorities, and are supported by the ratepayers, they are open to any one in the district who is suffering from infectious disease.

Naval Hospitals are the establishments on shore, under the Admiralty, for the treatment of sick and disabled officers and men of the Royal Navy and Royal Marines. The following is a list of these institutions:—The royal hospitals or infirmaries at Haslar, Plymouth, Yarmouth, Haulbowline (Queenstown), Chatham, Portsmouth, Walmer, Sheerness, Portland, Dartmouth; also at Malta, Bermuda, Halifax, Jamaica, Ascension, Gibraltar, Cape of Good Hope, Hong-kong, Yokohama, Esquimaux, Coquimbo, Trincomalee, and Sydney. The chief hospital is that at Haslar, and in it the sick-berth staff receives its training before going afloat. It is at Haslar also that practical training is provided for surgeons entering the Royal Navy medical department. On board ship the hospital is known as the sick bay, and the arrangements are in the hands of a medical officer, sick-berth stewards, and sick-berth staff.

Military Hospitals are either general or station hospitals; but for service in the field, extra establishments are equipped as base and field or movable hos-

pitals, which have companies of bearers for picking up the wounded from the fighting line. In addition, in most of our recent wars hospital ships have been sent to the port most accessible from the scene of operations. Each ship is a base hospital, and contains from 200 to 250 beds. These ships are chiefly employed for transporting sick and wounded to England.

The chief general military hospitals at home are the Royal Victoria at Netley, where Indian medical officers undergo training; the Cambridge at Aldershot, where the officers of the Royal Army Medical Corps are instructed; and the Herbert at Woolwich. Station hospitals are established at such important stations as Gibraltar and Malta; and all large garrisons have hospitals attached, which are now built on the pavilion system, and on the principles of hospital construction above described for civilian establishments. In Indian and tropical stations, however, the floor space and amount of air allotted to each bed should be double those for temperate climes. A field hospital moving with an active force contains accommodation for 100 cases, and there are ten field hospitals for every army corps of 40,000 men. They are intended only for the temporary reception of patients and for urgent operations. The patients get medical comforts in addition to their ordinary army rations, but they are not supplied with bedsteads. Serious cases are passed back as quickly as possible, through hospitals on the line of communications when the distance is lengthy, to the base, where the housing, nursing, and feeding do not differ much from those of a civil hospital, and where 520 beds are allotted for every 20,000 men in the field. See also ARMY HOSPITAL CORPS.

Hospital Ambulance, or *Street Ambulance*.—A somewhat similar organization has been formed for rendering 'first aid' or temporary relief in the case of street accidents, as well as for securing skilled assistance for the removal of sufferers to their homes or to a hospital. The Order of St. John of Jerusalem established their ambulance association in 1877, and in 1889 Mr. Bischoffstein inaugurated an ambulance service for London, in connection with which fifty-five stations are now scattered over the metropolis. Even this number is insufficient for the work they are called upon to perform. The head office of the service is at St. Mary's Hospital, Paddington. See FIRST AID.

Hospital Sunday and Hospital Saturday.—The churches have of

late years set aside for hospitals the offertories of one Sunday a year. Canon Miller of Birmingham is said to have originated this idea. With a similar aim Hospital Saturday has been established, during which collections for hospitals are made in the streets.

King Edward's Hospital Fund for London was initiated in 1897 by the King (then Prince of Wales) to commemorate the sixtieth year of Queen Victoria's reign. Since that time over 1½ million pounds has been subscribed, more than half of which has been invested. Grants to a large amount have been made to hospitals (within the seven-mile radius of Charing Cross, or within the London County Council area) from which applications for such were received, and for the endowment of free beds.

Hospodar, or *Gospodar*, a Slavonic word meaning 'master,' 'lord,' is a title which was given to Moldavian and Walachian rulers while those states were still subject to Turkey. The title was also assumed by the grand-dukes of Lithuania, and by the kings of Poland down to John Sobieski.

Host (L. *hostia*, 'a victim'), the name given to the consecrated wafer by those who treat the eucharist as a propitiatory sacrifice in the most literal sense of the word. It is also applied by anticipation to the unconsecrated altar bread in the offertory of the Roman Missal. The host, in the Roman Catholic Church, is a circular wafer of pressed unleavened flour, having some symbol stamped upon it, such as the Crucifixion, or the Lamb, or I.H.S. These are the symbolic marks which are forbidden, as 'points' and 'figures,' in the first prayer-book of Edward VI. The use of wafer bread in the Anglican Church is not very uncommon, but it is usually quite plain. In the Roman Catholic Church the celebrant breaks the host into two pieces, one of which he himself receives. The other piece he breaks over the chalice, and drops a portion into the wine—'the mingling of the body and blood of Jesus Christ.' In the Greek Church the consecrated bread is dipped in the wine before it is administered to the communicants. The Greek Church also differs from the Roman Catholic in using leavened bread.

Höst, JENS KRAGH (1772-1844), Danish historian, born in St. Thomas, W. Indies; one of the founders of the Scandinavian Literary Society, who did much to inspire independent historical research in his native country. He wrote *Grev Struensee* (1824), *Mårværdigheder i Kong Frederik V's Levnet* (1820), and *Clio* (4 vols. 1813-21).

Hostages, LAW OF, a measure passed in France (1799) for the purpose of combating the royalist reactionary movement.

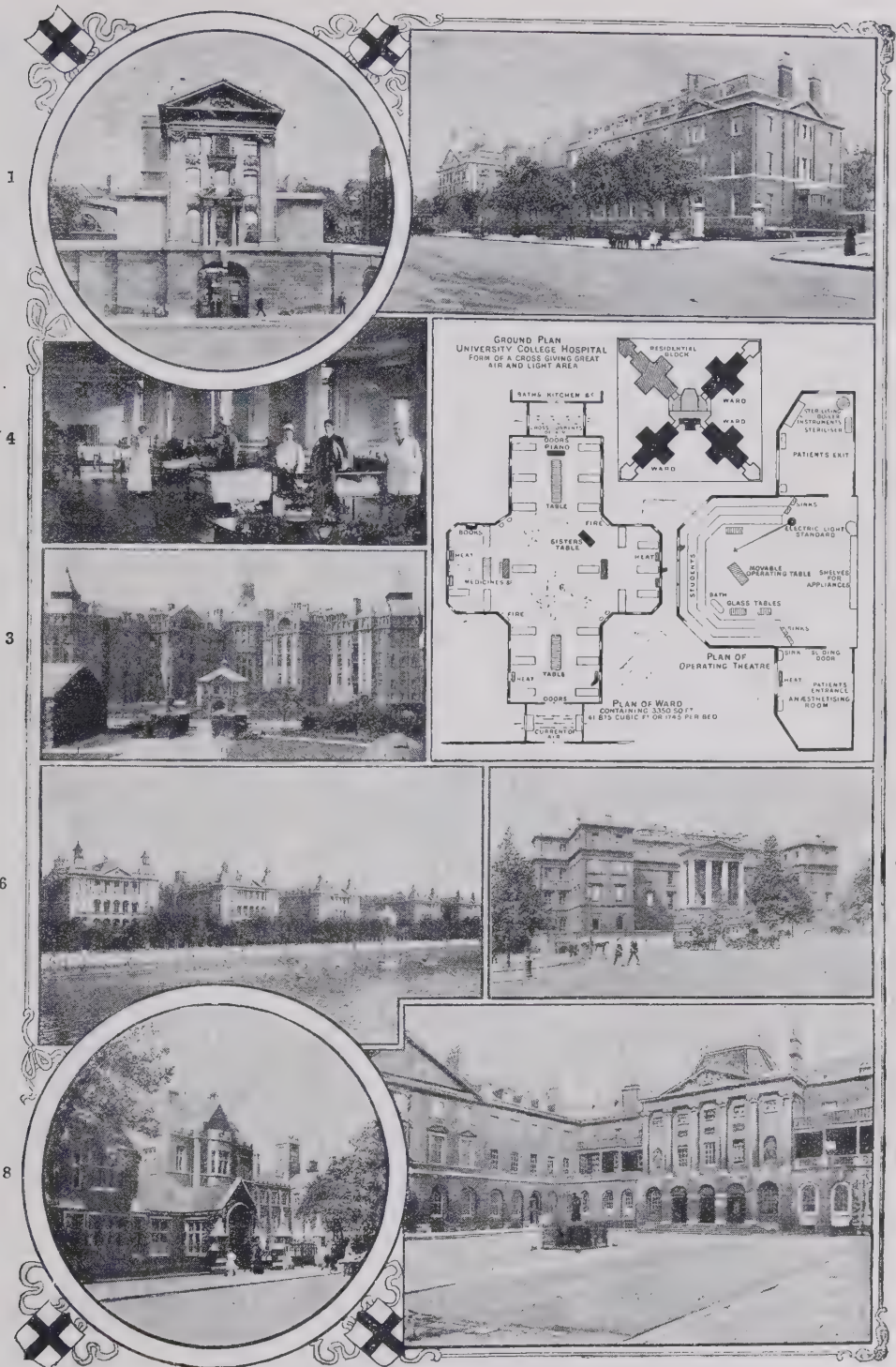
Hoste, SIR WILLIAM (1780-1828), English naval officer, was born at Ingoldisthorpe, Norfolk. In 1809 he carried out a series of operations in the Adriatic, and in 1811 defeated a superior squadron under Dubourdieu at the battle off Lissa, where he was wounded. Soon afterwards he captured Cattaro and Ragusa.

Hostilius, TULLUS (d. 640 B.C.), third of the legendary kings of Rome, is said to have succeeded Numa in 670, and to have conducted a series of successful wars against the Albans, Fidenæ, Veii, and the Sabines. He is said to have been destroyed by fire from heaven because of his impiety.

Hostrup, JENS CHRISTIAN (1818-92), Danish poet and dramatist, born at Copenhagen; became (1855) pastor at Silkeborg, and afterwards (1862-84) at Fredriksborg. He wrote numerous vaudevilles and comedies, scarcely inferior to those of Heiberg, such as *Gjenboerne* (1844), *Tordenvejr* (1851), *Mester og Lærling* (1852), *Drøm og Daad* (1854), and the realistic drama *Eva* (1882). He published two volumes of poetry, *Sange og Digte* (1872 and 1884). His *Folkelige Foredrag* (3rd ed. 1884), or popular lectures, testify to his zeal for the education of the people. His *Samlede Skrifter* appeared in 1865; his collected *Komedier* in 1889; and his autobiographical *Erindringer* in 1891 followed by *Senere Livserindringer* in 1893.

Hotbed, a mass of fermenting material the heat generated by which is utilized for the purpose of accelerating or aiding the growth of plants. In preparing a hotbed it is desirable to get together a good supply of fresh stable litter, and, if obtainable, an equal quantity of freshly-collected leaves. This heap should be turned on alternate days three or four times. It should be moist, but not too wet, watering if necessary. The heap should be squared off to the size of the frame which is to enclose it, the depth of the bed being not less than three feet. A foot depth of soil is to be placed on the surface, and in a few days the frame will be ready for use.

Hotchpot. In the division of the personal estate of intestates in England among children under the Statutes of Distribution, any considerable gift made by the deceased in his lifetime to any of the children is brought into hotchpot—i.e. the amount of the gift is added to the estate, and the whole is divided among the children, the child to whom the gift was made receiving his



The Hospitals of London.

1. St. Bartholomew's: entrance gateway. 2. London Hospital. 3. University College Hospital. 4. University College Hospital: interior of ward.
5. University College Hospital: ground plan. 6. St. Thomas's. 7. St. George's. 8. Hospital for consumption, Brompton. 9. Guy's.

share less the amount of the gift. A clause, known as the hotchpot clause, having the same effect, is often found in wills and settlements.

Hotel (Old Fr. *hostel*; hence *hostelry*), a word with a varied history. In France it originally meant the mansion house of a noble or a person of distinction; then the residence of a *maire*; and, later, a place where paying guests were lodged and entertained. At the present time in France and Belgium a *hôtel de ville* corresponds with the English town hall, usually containing a barracks, a prison, the offices of the various local bodies, the residence of the local chief magistrate, and the court house. A *hôtel de Dieu* is the term used in France for a hospital for the sick.

The modern hotel may be said to date from the formation of railways, prior to which the old-fashioned but comfortable inn held its place. In the palatial buildings now constructed for the accommodation of travellers, the central feature is an imposing entrance hall, around which are the hotel offices, the post, telegraph, and telephone offices, reading-room, writing-room, smoking-room, and frequently a reception room. Of late years the size, architectural splendour, and internal embellishment of hotels have been ever increasing; yet despite this the charges in the best houses are comparatively moderate: a daily charge of from ten to fifteen shillings will make a visitor free of nearly every hotel in the world—summer or winter. In European hotels the usual way is to make a charge for the use of a room or rooms, and a separate charge for the meals partaken of; while in American hotels it is customary to make a fixed charge per day for both room and food.

Like other large businesses, hotels have in many cases become the property of joint-stock companies, and several such companies have been formed solely for the building and running of colossal hotels. Of these, the best known are the Gordon hotels, now fifteen in number, including two on the Riviera, which have formed the model for many imitators.

The hotel-keeper is bound, if he has room, to receive and provide with lodging and food all respectable travellers who apply to him. He is liable, generally-speaking, for loss of his guest's property within the hotel, unless the guest is in fault; but this liability is, under certain conditions, limited to £30. He has a lien on the goods of his guest for his charges. See **INNKEEPER**.

See *Pascoe's London of To-Day* (last ed. 1903); 'On Hotel-keeping, Present and Future,' in the

Century Magazine, viii. 577-587; Griffiths's 'Hotels at Home and Abroad,' in the *Fortnightly Review*, lxvi. 256-263; and Plunkett's 'Modern Hotels,' in *Scribner's Monthly*, vi. 486-492.

Hottham, WILLIAM, FIRST LORD (1736-1813), English naval officer. In 1778 he served under Howe, and took part in the operations against D'Estaing's squadron, and in 1780 was present at the battles off Martinique. In 1795 he fought two rather unsatisfactory though successful actions with the French off Genoa and off Hyères. In the same year he became a full admiral.

Hothouse, a term generally applied to glass houses used for raising tropical fruits and vegetables in temperate regions, or for forcing fruit, vegetables, or flowers. Hothouse cultivation is much more accurate and sure than ordinary outdoor gardening, as the grower is less dependent on weather and other uncontrollable influences. The simplest form of hothouse is a span-roofed glass house with a central path, cut two feet deep below the surface of the ground, running along its length, and hot-water pipes running along the side of this path. It is better, where expense is not so important a matter, to build large span-roof buildings, 200 ft. or more in length by 24 ft. wide and 12 ft. high to the ridge, the roof resting on brickwork. In any case ample provision must be made for ventilation, both at the ridge and at the sides. Heating is effected by hot water driven by a good boiler, set well below the level of the house, through a sufficiency of four-inch piping. Choose a boiler larger than the maker's estimate as to the size required to heat the given quantity of piping. Tomatoes, grapes, cucumbers, peaches, French beans, roses, carnations, ferns, asparagus, strawberries, and numerous bulbous and other flowering plants are among the plants commonly forced. Bailey gives the following useful table of customary temperatures in which plants are grown under glass. (See *Horticulturist's Rule-Book*.)

	Day.	Night.
Asparagus (edible).....	85°	85°
Asparagus plumosus.....	70°	60°
Beans.....	75°	65°
Carnation.....	60°	50°
Cauliflower.....	50°	40°
Chrysanthemum.....	55°	45°
Cucumber.....	80°	70°
Easter lily.....	65°	55°
Lettuce.....	55°	45°
Lily of the valley.....	90°	90°
Melon.....	80°	70°
Mushroom.....	65°	65°
Radish.....	55°	45°
Rose.....	65°	55°
Smilax.....	69°	50°
Tomato.....	75°	60°
Violet.....	50°	40°

The term greenhouse is frequently used as synonymous with hothouse; more properly it means a glass house with little or no artificial heat. On the other hand, a glass house heated to a high temperature is sometimes designated the stovehouse.

Hot Springs, city, Arkansas, U.S.A., co. seat of Garland co., in the Ozark Hills, 48 m. s.w. of Little Rock, in the midst of a group of mineral springs (76° to 160° F.). A national hospital for the army and navy is situated here, and the place is a great health and pleasure resort. Pop. (1900) 9,973.

Hotspur. See **NORTHUMBERLAND, DUKES AND EARLS OF**.

Hottentot, the native race of S. Africa. The people call themselves Khoi-Khoi (otherwise Quai-Quai), and they comprise the Namaquas, the Koranas, and the Griquas, as well as the 'Totties,' who have been for generations the servants of the Boers. The term has also been held to include the Bushmen; but these, although intermingled with the Hottentots, are probably of a different stock originally. In appearance the Hottentots are well-proportioned, but slender, of medium height, with yellow complexion, oblique eyes, prominent cheek-bones, noses usually flat, and woolly, tufted hair. They have undoubtedly several marked Mongoloid affinities. Their women are frequently characterized by the fatty protuberances exemplified in the person of the 'Hottentot Venus,' who died at Paris in 1821. Most of the Khoi-Khoi are Europeanized; but a minority still lead a nomadic desert life. They recognize a supreme being, known as Utika ('the beautiful') and as Tsuni-Ggoam. (See Hahn's *Tsuni-Ggoam*, 1882.) For their folklore, see Bleek's *Reynard in S. Africa* (1864); and for their language, Tindall's *Grammar and Vocabulary* (1857), Hahn's *Die Sprache der Nama* (1870), Olpp's *Nama-Deutsches Wörterbuch* (1888), and Krölein's *Wortschatz der Khoi-Khoi* (1889).

Hottentots Holland, dist. of valley and mountain in w. prov. of Cape Colony, below Stellenbosch. When the mists form over Hottentots Holland peaks, due warning is given of a 'southeaster.'

Hot-water Heating. See **HEATING**.

Hotze, FRIEDRICH, BARON VON (1739-99), properly Johann Konrad Hotz, Austrian general, born at Richtersweil, Zürich. After serving in the Würtemberg and Russian armies, he entered that of Austria, and rose to the rank of field-marshal. Hotze took part in the Rhine campaign (1795-5),

commanding an army corps in S. Germany (1796), and being commander-in-chief of the army that invaded Switzerland (1799), and was there killed in action near Zürich.

Houdin, ROBERT. See CONJURING.

Houdon, JEAN ANTOINE (1741-1828), French sculptor, born at Versailles, and won the Prix de Rome in the Academy (1761). He remained at Rome ten years, and during that period executed his fine colossal statue of *St. Bruno*; then returning to Paris, he was admitted to the Royal Academy (1777), and was elected member of the Institute (1796). In 1785 he went to America, where he sculptured *Washington*, placed in the state house at Richmond, Virginia. He took infinite pains in his portraiture, his best-known statues being *Voltaire* and *Cicero*; busts of *Napoleon*, *Ney*, *Rousseau*, *Franklin*, *Buffon*, *D'Alembert*, *Diderot*, and *Mirabeau*. His work was classically simple, but his mastery of his materials was complete.

Houghton, RICHARD MONCKTON MILNES, FIRST LORD (1809-85), English author, was born in London. At Cambridge he knew Tennyson, Hallam, and Thackeray. In 1831 he went to London, came under the influence of F. D. Maurice, Thomas Campbell, and J. Sterling, and (1835) began to publish poetry. He entered Parliament (1837) as M.P. for Pontefract, and showed marked sympathy with the revolutionary tendencies of 1848 abroad. He was a good friend to young authors, and his posthumous care for the fame of Keats outweighs the value of his personal contributions to literature. In 1853 he founded the Philobiblon Society, and about 1857 helped to set on foot annual social science congresses. He published poetical works under various titles (1834, 1838, 1840, 1844); *Collected Poems* (1876); *Selections from Poems* (1863, 1867); *Life and Letters of Keats* (1848); *Monographs* (biographical) in 1873. See *Life* by T. Wemyss Reid (1890).

Houghton-le-Spring, tn., 6 m. N.E. of Durham, England, with iron works. Bernard Gilpin, the 'Apostle of the North,' was rector here (1556-83). Pop. (1901) 7,858.

Houlder Steamship Line (Messrs. Houlder Brothers and Co., Ltd., managers) conducts an important cargo service between England and Australasia, River Plate, and S. Africa, and has an extensive trade in frozen meat and live stock. As far back as 1849, Messrs. Houlder Brothers and Co. established a line of sailing-vessels between London and Australasia. The present

fleet, including the vessels of the Empire Transport Co., Ltd., numbers 14 vessels, aggregating 69,258 tons. The Houlder Line, Ltd., was formed in 1899, with an authorized capital of £500,000.

Hound. See BLOODHOUND, FOXHOUND, STAGHOUND, etc.

Hound's-tongue (*Cynoglossum*), a genus of plants belonging to the order Boraginaceæ. The funnel-shaped corolla has a short tube, and its throat is closed by blunt scales. *C. officinale*, the common hound's-tongue, is a native British plant, about two feet high, found on waste land. It is a hardy plant, with down-covered leaves, reddish flowers, and prickly seeds, and has a mousy smell.



Hound's-tongue.

1, Corolla, open; 2, fruit; 3, prickly seed from nut.

Hounslow, tn., Middlesex, England, 10 m. w.s.w. of London. The powder mills, notorious for disastrous explosions, stand 2 m. s.w., in the parish of Twickenham. In coaching days it was the first stage on the road to Southampton and Bath. About 1837 some five hundred coaches are said to have passed through it daily. Hounslow Heath, w. and s.w. of the town, covered in 1546 some 4,300 acres. It was formerly notorious for highway robberies and murders. The cavalry barracks were erected in 1793. Pop. (1901) 11,377.

Hour, a space of time consisting of 60 minutes, the twenty-fourth part of a civil day. Solar and sidereal hours are the twenty-fourth part of the corresponding days. The Babylonians, Greeks, and

Jews divided day and night respectively into 12 'unequal' or 'planetary' hours, equal hours being termed 'equinoctial,' because, at the equinoxes, the two systems coincided. 'Double' hours of 120 minutes were employed by the Chinese and the Japanese.

Hour-angle, the angle made with the meridian by the hour-circle of a star, or the difference between the sidereal time of observation and the right ascension of the object observed. It is measured in hours, minutes, and seconds of time, equivalent to the same number of degrees, minutes, and seconds of arc multiplied by 15.

Hour-circle, any great circle drawn from pole to pole of the heavens. The hour-circle passing through the zenith of the observer is the celestial meridian. Also a circle attached at right angles to the polar axis of an equatorially mounted telescope, by which settings in right ascension are effected. It is graduated into hours, minutes, and seconds.

Hour-glass, an appliance used to estimate definite portions of time, consists of a glass vessel with a narrow duct or neck joining two oval-shaped receptacles in such a manner as to form the figure 8. Into this instrument, during its construction, sand or some other powder is introduced in such quantity as to occupy a definite period of time in flowing through the neck from the upper to the lower chamber. Instruments similar in principle were employed by the ancients. By the Romans they were called *clepsydre*, or water-clocks, liquids being used in place of sand.

Hour, one of the seventy-two beautiful damsels whose companionship in paradise is part of the reward of every true Mohammedan after death. They are endowed with perpetual youth and every charm, and are held by more cultivated Moslems to symbolize spiritual blessedness.

Housatonic, riv., New England, U.S.A., rising in W. Massachusetts, and flowing nearly s. across Connecticut to Long Island Sound. Its length is 125 m., and its drainage area 1,933 sq. m. It is navigable to Derby, Connecticut.

House. The word as used here may be defined as meaning a building designed to be used as a place of residence, and includes a cottage and a flat as well as a detached house. In law, the right of an occupier to protect his house is a very ancient constitutional safeguard both in England and in Scotland; but English law affords the householder a much stronger position than he can claim by the law of Scotland. Except in the case of a criminal offence,

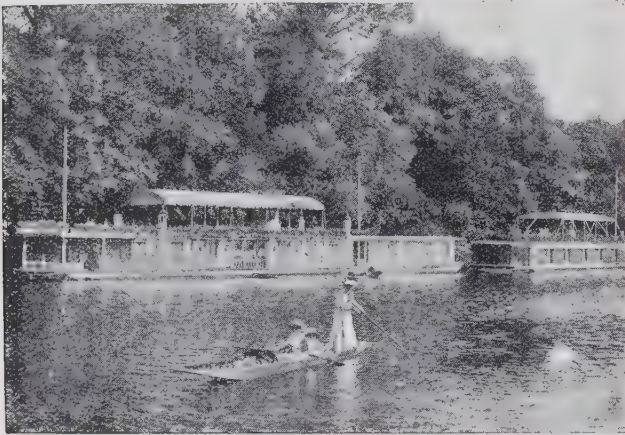
an Englishman may hold his house against all comers. It is not lawful to break into a house in execution of a civil warrant, except under exceptional writs issued by the court; but if a bailiff once obtains, by any means, access to the interior, he cannot be expelled therefrom. Any amount of force, however, can be used in putting into execution a *criminal* warrant either in England or in Scotland.

The law holds the employment of any force requisite to defend a house against trespass or burglary justifiable even to the extent of homicide, although it is impossible to lay down any hard-and-fast rule as to the amount of opposition necessary for that purpose, every case depending on its peculiar circumstances. In Scotland a house may be broken into for the purpose of

House-duty. The inhabited house duty is an imperial tax (the successor of the window tax) introduced in 1851, and payable by the occupier of an inhabited house exceeding £20 a year in annual value. Charities, public buildings, and houses occupied only by a caretaker are exempted. For houses over £20 and under £40, it is 3d. in the £1; over £40 and under £60, 6d.; over £60, 9d. In the case of shops, lodgings, and hotels the rate is lower, and varies from 2d. to 6d. in the £1.

House-fly (*Musca domestica*). In early summer house-flies live largely out of doors, but as autumn approaches and the nights grow chill they seek refuge within. In late autumn very many fall victims to a fungoid disease; others find refuge in crevices, whence they emerge on fine days

Household, ROYAL. The household of the sovereign, the establishment of which is settled at the passing of the Civil List Act, is constituted partly of personal and partly of ministerial appointments. Of those which are directly personal to his Majesty the most important are the master of the household, the keeper of the privy purse, and the King's private secretary. The first of these high positions is held by Lord Farquhar, formerly a member of the House of Commons, and for many years the King's right-hand man of business; General the Right Hon. Sir Dighton M. Probyn, V.C., who was comptroller and treasurer to his Majesty when he was Prince of Wales, holds the second appointment; and Lord Knollys, G.C.V.O., K.C.B., K.C.M.G., is his Majesty's private secretary. All the 'great' officers of the household, as they are designated, are the nominees of the ministry of the day, and they vacate their posts on a change of government. The officers thus indicated are the lord steward, the treasurer of the household, the comptroller of the household, lord chamberlain, vice-chamberlain, captain of his Majesty's Bodyguard of the Honourable Corps of Gentlemen-at-Arms, captain of his Majesty's Bodyguard of Yeomen of the Guard, and the master of the horse. During the reign of Queen Victoria the master of the buckhounds was also in the patronage of the government, but the office was abolished in 1901. Of the offices here enumerated those of the treasurer, the comptroller, and the vice-chamberlain, who form part of the *personnel* of the lord steward's department, are usually held by members of the administration sitting in the House of Commons. The remaining 'great' officers of the household are invariably peers. The only other offices in the household, when the sovereign is a male, the retention of which is dependent upon the existence of the ministry, are those of the lords in waiting, with the exception of the permanent lord in waiting, who is appointed by his Majesty. Like all other members of the administration, the lords in waiting are nominated by the prime minister, and, as in the case of all his recommendations for office, submitted by him for the approval of the sovereign. The functions of the office are ceremonial and not administrative. The number of lords in waiting is limited to seven. The grooms in waiting, extra grooms in waiting, and gentlemen ushers, who form a considerable part of the household, are appointed by the sovereign. There is a salary



Houseboats on the Thames.

[Photo by Plumbie.]

executing a civil process, as a Scottish court (whether the supreme court or the sheriff court) can by writ authorize an officer to force a door and either arrest or detain, as may be craved for in the petition presented for its consideration and decision. See ARCHITECTURE, BUILDING, BRICKLAYING, CARPENTRY, and MASONRY.

Houseboat. Millions of the population of China, of Burma, and of India are born, live, and die in floating habitations closely resembling the thatched huts on land. In England the square-cornered, slow-moving craft of today first made its appearance in the river Thames, and has become one of the most important institutions of fashionable English life. Since then the English 'broads,' firths, and estuaries have been extensively utilized as anchorages for these floating houses.

during winter. The eggs are laid among refuse, especially excrement, upon which the larvae feed. Flies are not unimportant agents in the dissemination of disease, especially such a disease as enteric. The feet are so con-



House-fly.

stituted as readily to carry foreign particles. On the other hand, it should be noticed that flies are so far beneficial in that they destroy noxious and putrefying substances.

attached to the first and third named offices, and their number is limited; but the extra grooms in waiting are unpaid, and there is no limit to their number. The other officers comprised in the household include the gentleman usher of the black rod, the poet laureate, the governor and constable and the lieutenant-governor and deputy-constable of Windsor Castle, marine painter, surveyor of the King's pictures and works of art, keeper of the jewel house, keeper of the King's armoury, the sergeants-at-arms attending the Lord Chancellor and Mr. Speaker, the crown equerry, equeries in ordinary, and the extra equeries. There are also the appointments to the chapels royal and in the medical department, which are made by the sovereign on the advice of his ministers. When the monarch is a female, the appointments of the ladies of the bedchamber, in addition to those already mentioned, are subject to ministerial changes. The practice in this respect was really settled by what was known in contemporary annals as the 'Bed-chamber Plot.' Lord Melbourne's government, finding in 1839 that they could not carry their measures, tendered their resignation; and Queen Victoria, on the advice of the Duke of Wellington, sent for Sir Robert Peel. The royal household had been formed at the beginning of the reign with the advice of the ministers in office at the time, and it contained, among others, the wife of the Irish viceroy and a sister of the chief secretary for Ireland, both of whom were ladies of the bedchamber. Sir Robert Peel, having obtained the royal assent to the cabinet he proposed to form, intimated to her Majesty that it would also be necessary that he should be permitted to recommend certain changes among the ladies of the household. He felt that his authority in the country would be impaired if the Queen were to remain surrounded with the friends and relatives of the late ministers. Her Majesty refused to consent to these changes, and appealed to Lord Melbourne and his cabinet for advice. The ministers drew up a memorandum, in which the Queen was advised to inform Peel that she could not consent to adopt a course which she conceived to be contrary to usage, and which was repugnant to her feelings. Peel thereupon abandoned the attempt to form a ministry, and Melbourne and his colleagues remained in office. Two years later, however, when Peel was again sent for, the principle for which he had contended in 1839 was conceded, and it has now been constitutionally established. The queen consort, Queen

Alexandra, has a separate household, which consists of a lord chamberlain, vice-chamberlain, treasurer, private secretary, equerry, mistress of the robes, ladies of the bedchamber (four), extra ladies of the bedchamber (whose number is not limited), bedchamber women (four), maids of-honour (four), groom of the robes, clerk of the robes, and clerk. There are also households of the Prince of Wales, the Princess of Wales, the Duchess Alfred of Saxe-Coburg-Gotha (Duchess of Edinburgh), the Duke of Connaught, the Duchess of Connaught, the Duchess of Albany, Prince Christian, Princess Christian, Princess Louise (Duchess of Argyll), and Princess Beatrice. The appointments to all of these, however, are personal and not ministerial. The sums allocated to the King and Queen for maintenance of their households are £125,800 for salaries and £193,000 for expenses. The amount set aside for their Majesties' privy purse is £110,000, and for royal bounty and works £33,200.

House-leek, the popular name of the genus *Sempervivum*, a subdivision of the order Crassulaceæ. They are succulent plants, the leaves being commonly revolute. Their flowers are usually stellate, sepals and petals being six or more. A large number of species are hardy in Britain, thriving best in the lightest and poorest of soils. The common house-leek (*S. tectorum*), which has become naturalized on roofs and walls, shows rosettes of thick, grayish-green, fringed leaves and purple flowers in summer. Among the species specially worth cultivating are the 'hen-and-chickens' house-leek (*S. soboliferum*), so named from the numerous young rosettes which it produces, *S. montanum*, *S. globiferum*, *S. Funckii*, and the 'cobweb' house-leek (*S. arachnoideum*), which derives its name from the silky hairs linking together the apices of the leaves.

Housemaid's Knee, a popular name for a swelling of the bursa, or pouch containing serous fluid, which lies just over the kneecap. It is the result of continued irritation, such as may follow constant kneeling on hard floors. The onset is sudden; the knee becomes red, hot, swollen, and tender. Rest and counter-irritation may cure it if taken early; but if suppurative threatens, the swelling must be incised before there is a spread of the mischief, which may cause necrosis of the bone or extend into the joint. Chronic cases are treated with iodine and strapping.

House of Commons. See PARLIAMENT.

House of Lords. See PARLIAMENT.

Housing of the Working Classes. The housing problem, to which much public attention is directed at the present time, arises from the fact that there are not in this country enough cheap houses to accommodate the working classes, and especially the working population of the towns, in a state of health and decency. The problem is largely due to the continuous and rapid expansion of our towns and cities. Its origin may be found in the industrial movement which changed Great Britain from a mainly agricultural to a mainly manufacturing country in the end of the 17th and beginning of the 18th century. The movement of population from the country to the towns, where work was sure to be found in the factories, led to a hasty extension of urban areas without care for the health of the people, knowledge of the laws of sanitation, or foresight of the difficulties that were being handed down to future generations.

History of the Housing Movement to 1890.—The introduction of modern local government by the Poor Law Act of 1834 led to the disclosure of great evils in regard to housing, and ever since that time public attention has been more or less directed to the housing question. A royal commission was appointed in 1843 to inquire into the condition of the large towns. In 1851 Lord Shaftesbury introduced and passed two bills for providing and improving lodging-houses. In one of his speeches in that year he drew attention to the parish of St. George's, Hanover Square, one of the best in London, and showed that out of 1,465 families of working people, 929 lived in one room, 408 in two rooms, and 94 in three rooms. In 1868 the Torrens Act (Artisans' and Labourers' Dwellings Act) made it the duty of owners to keep their property in good order, and established the right of vestries to enforce this obligation and to demolish insanitary houses. In 1875 the Cross Act (Artisans' and Labourers' Dwellings Improvement Act) extended the right of local authorities to dealing with groups of houses—now called 'slum areas.' Both the Torrens Act and the Cross Act were subsequently amended on several occasions, and much useful reform has been carried out under the powers they conferred. Progress was also made during this period with improvements of sanitary law by private municipal acts and the Public Health Acts of 1848, 1872, and 1875. These gave to local authorities powers in regard to cleanliness of houses, ventilation, water supply, cisterns, drains, dustbins, height of rooms, over-

crowding, infectious diseases, and other matters.

Under these acts a great improvement was effected in the condition of the people. It has been estimated that £122,000,000 was spent between 1830 and 1894 in water supply, drainage, and other sanitary schemes. Large sums were also spent on clearing slum areas. Loans under the Torrens and Cross Acts had in 1890 been sanctioned to the extent of £2,350,000. The Metropolitan Board of Works, then the authority for London, between 1875 and 1890 spent over 1½ millions on improvement schemes, clearing insanitary areas, and reselling the sites to private building companies for the erection of 7,026 workmen's houses. The large provincial towns (notably Glasgow and Liverpool) also inaugurated extensive improvement schemes. At the same time, the Society for Improving the Condition of the Labouring Classes (founded by Lord Shaftesbury in 1851), the Peabody trustees (to whom Mr. Peabody handed over £500,000 for building purposes), the Improved Industrial Dwellings Company, Ltd., and other private enterprises, did much to provide cheap and sanitary houses. Thus both public and private enterprise were stimulated into action. The effect of the early housing work appears very plainly in the reduction of the death-rate, which in London decreased from 27 per 1,000 in 1841 to 15·2 per 1,000 in 1903.

In 1884 a royal commission (of which the King, then Prince of Wales, was a member) was appointed, and did much, by its report, to quicken public interest in the housing question. Its recommendations were—(1) It should be the duty of local authorities to prevent buildings being in an insanitary state; (2) further powers of inspection; (3) framing of building regulations; (4) facilities for building by local authorities; (5) rating of vacant sites at 4 per cent. of their value; (6) compulsory purchase of sites on modified terms; (7) cheap government loans; (8) rehousing of people displaced by railway companies, etc.; (9) cheap workmen's trains; (10) facilities for workmen acquiring their own houses; (11) cheaper land transfer; (12) encouragement of small holdings.

This resulted in the passing of the Housing of the Working Classes Act, 1890. The act contains three chief parts, and consolidates and amends the law formerly contained in three separate sets of acts—the Artisans' Dwellings Acts (Cross's Acts), dealing with 'unhealthy areas'; the Labouring Classes' Dwellings-houses Acts (Torrens's Acts), dealing with

'unhealthy dwelling-houses'; and the Labouring Classes' Lodging-houses Acts, dealing with 'common lodging-houses.'

Several amendments to this act have been passed. In addition, by the Small Dwellings Acquisition Act (1899), local authorities have been empowered to advance money to persons for acquiring small houses in which they live. The general effect of these acts has been to facilitate and greatly extend the housing operations of municipal authorities. They have not, however, dealt effectively with the pressing problems of cheaper transit, cheaper sites, and cheaper buildings.

What Local Authorities have done.—In addition to sanitary inspection, the work of municipalities in this connection may be divided into (1) demolition of insanitary houses and reconstruction on the sites cleared; (2) provision of additional dwellings.

(1.) Demolition and reconstruction. London authorities, according to a County Council Report of 1900, had spent up to that time about 4½ millions upon this work, of which nearly 3 millions had been unremunerative and 1½ millions had proved remunerative from rents received. In all, London's local authorities have displaced about 50,000 persons from condemned areas. The largest single area cleared is the Boundary Street area in Bethnal Green, 15 acres in extent, with a population of 5,700. The improvement cost £280,000. It reduced the death-rate of the district by one-half. Extensive improvement schemes have been completed by provincial authorities—e.g. Birmingham, £550,000; Greenock, £200,000; Wolverhampton, £250,000; Liverpool, £500,000. Glasgow (through its Improvement Trust) has spent £2,000,000, of which £600,000 was drawn from rates. All these schemes involved large additional expenditure on buildings. Between 1890 and 1904 loans by other provincial authorities were sanctioned to the amount of about two million pounds. (2.) Provision of additional dwellings. The total number of dwellings erected by provincial towns exceeds 10,000, and the cost of buildings and sites is about 2½ millions. It may be said that, including London, over £10,000,000 has been spent in slum clearances and house-building by municipalities under the Housing Acts.

The cities which have led the way in municipal housing have been London and Glasgow. In London, slum improvements were begun by the Metropolitan Board of Works, who bought the condemned areas, and then sold the

sites at a much lower price to private companies for building working-men's houses. When the London County Council took over its powers, it decided to do the rebuilding as a municipal enterprise.

The block buildings of the London County Council are generally built of brick, and are of fireproof construction. An open space of 40 ft. or more is left at the back of each block. Between the blocks are paved yards used as playgrounds by the children.

In addition to building within the London area, the London County Council have undertaken large schemes for building in the country. At Tottenham they have bought 225 acres, to erect thereon cottages for 42,500 persons.

Glasgow's tenements contain larger rooms than those in London, but the construction is said to be inferior. The building cost in Glasgow is 4½d. to 6d. per cubic ft.; in London it works out at 8½d. to 10d. The cost per room is—Glasgow, £70 to £95; London, £95 to £120.

As far as schemes for clearing slum areas and rebuilding on the sites are concerned, even if the value of the site is calculated at 'housing value' (which varies from one-tenth to one-third of the actual cost), the average return is only 3½ per cent. It is therefore impossible for rebuilding on condemned areas to pay a fair return on the total actual cost of site and buildings. In the case of the provision of additional buildings, however, municipal undertakings have paid a return of about 4 per cent. on the total actual capital outlay.

Private Trusts and Associations.—Little mention has yet been made of the housing work done by philanthropic private persons, bodies of trustees, etc. In London alone about £6,000,000 had been spent by these agencies to 1900, and accommodation had been provided for 120,000 persons. Many similar associations exist in provincial towns. The reconstruction of old buildings, for instance, has been almost entirely done by private persons and companies. The work was begun by Miss Octavia Hill, and in all our large towns this more modern form of housing reform is being carried out.

Rural Housing.—In Ireland, some 16,000 municipal cottages have been erected under the Labourers Acts, but only six local authorities in Great Britain have as yet used their powers in this matter. A great deal of interest has been taken in this question by landed proprietors, and experimental cottages have been erected in many districts. In 1905 an exhibition of cheap



Housing of the Working Classes.

1. Sandwich and Winchelsea Buildings, Swan Lane, Rotherhithe (London County Council). 2. Romney, Rosetti, Ruskin, and Hogarth Buildings, Millbank (L.C.C.). 3. Doorway of Macise Buildings, Millbank (L.C.C.). 4. Norfolk House, Westminster (Westminster Corporation). 5. L.C.C. Cottages at Blakenham Road, Lower Tooting. 6. Second-floor Plan, Swan Lane, Rotherhithe (L.C.C.). 7. Ground-floor and first-floor Plans, Idenden Cottages (L.C.C.). 8. Second-floor Plan, Millais and Leighton Buildings, Millbank (L.C.C.). 9. Second-floor Plan, Siddons Buildings, Marquis Court, Drury Lane (L.C.C.).

cottages was held at Letchworth, and nearly a hundred specimens were erected at a cost of from £110 to £250 each. The erection of rural cottages is much hindered by the building by-laws adopted by many local authorities.

Several societies have been formed with the object of securing reforms in the directions indicated here. The principal are the National Housing Reform Council, 432 Strand, W.C.; the Housing Reform Council for the West of Scotland, 34 Findlay Drive, Glasgow; and the Liverpool Housing Association, 50 Cardigan Street, Liverpool. See Allan's *The Housing of the Working Classes Acts*, Stewart's *The Housing Question in London*, Bowmaker's *Housing of the Working Classes*, Sykes's *Public Health and Housing*, Crotch's *The Cottage Homes of England*, and Thompson's *Housing Handbook*.

The Programme of Housing Reformers.—The complexity of the housing problem may be most clearly shown by the programme of those most interested in the question. It is desired—(1.) To obtain cheaper sites for building houses in towns. In London, sites sometimes cost as much as the building erected on them. To do this it has been proposed to tax vacant sites, or in some other way to prevent the price of land rising in proportion to a city's growth. (2.) To define the limits of municipal and private enterprise. Unquestionably these overlap and compete in many cases at present. It is claimed that in many cities private enterprise would provide enough working-men's houses of the best class, and that the municipalities sometimes offer specially good houses below their market value. The provision of the cheapest houses at rents which labourers can pay is generally considered to be beyond the powers of private persons, and it is suggested that this should be undertaken wholly by the municipalities. (3.) To discover cheaper building methods, and to obtain the repeal of building by-laws which restrict the adoption of cheap material and cheap design. (4.) To extend tramways and suburban railways, and thus move much of the population outside the central parts of the cities. Though this might only directly touch the best class of working-men, it is believed that their removal to the suburbs would leave many additional houses in the central parts of the cities to be let at reduced rents. (5.) To prevent temporary house famines, due to city or railway improvement schemes, by providing that new houses must be erected before insanitary ones are demolished, and that the new

houses should be rented at about the same rents as the old. See GARDEN CITY MOVEMENT.

Houssain, or Hussan. See HASSAN.

Houssas. See HAUSAS.

Houssaye, ARSENE (1815-96), French *littérateur*, whose proper name was Housset, was born at Bruyères (Aisne), and made a literary name at twenty-one. During the rest of a long life he was a prolific writer of novels, poems, plays, and histories relating to literature and art. See his *Confessions* (4 vols. 1885-91).

Houssaye, HENRY (1848), French historian, son of Arsène Houssaye, was born at Paris. His *Histoire d'Alcibiades* (1873) was awarded the Thiers prize by the French Academy. His *1814 and 1815*, which appeared in three volumes between 1888 and 1899, is a work of the highest authority on the last campaigns of Napoleon. An English translation of the *Waterloo* volume was published in 1900.

Houston, city, Texas, U.S.A., co. seat of Harris co., 48 m. N.W. of Galveston; produces rice, cotton, and sugar. It is also near newly-discovered oil fields. Chief industries: railway carriages, machinery, cotton and oil mills; also a trade in lumber and sugar. Pop. (1900) 44,633.

Houston, SAM (1793-1863), president of Texas, born near Lexington, Virginia; passed several years of his life as adopted son of a Cherokee Indian. After studying law he became a member of Congress (1822), and governor (1827) of Tennessee. In 1832 he was made commander-in-chief of the army in the Texan war, and defeated and captured Santa Anna at San Jacinto (1836), thus deciding the separation of Texas from Mexico. He became president of the state (1836) after it entered the Union, and governor in 1859, but was deposed (1861) because he did not favour the Confederate cause. See *Life* by Crane (1884) and Bruce (1891).

Houston Steamship Line, established in 1883, conducts a cargo service between London, Liverpool, New York, and the River Plate and S. Africa. It possesses twenty-seven steamers, aggregating 96,274 tons.

Hovas. See MADAGASCAR.

Howden, or HOWDEN, ROGER OF (c. 1117-1200), English chronicler, born in Yorkshire, filled important offices at the court of Henry II.; became one of the northern forest justices, and finally professor of theology in Oxford. His *Chronicle*, in Latin, dates from the close of Bede's *Chronicle* in 732 to 1201, being chiefly a record of events in the history of England. It was first printed in 1596, in Sir H. Savile's

Scriptores post Bedam, and was translated by H. F. Riley for Bohn's Antiquarian Library (2 vols. 1853). See the Rolls Series, edited by Dr. Stubbs (1868-71).

How, WILLIAM WALSHAM (1823-97), bishop of Wakefield, was born at Shrewsbury, and was presented to the living of Whittington, Salop (1851). In 1854 he was rural dean of Oswestry, canon of St. Asaphs (1860), and suffragan (as bishop of Bedford) to the bishop of London. In 1888 he was translated to the see of Wakefield. He was the author of *Plain Words* (1859), *Pastor in Parochia* (1868), *Psalms and Hymns* (1854), *Commentary on the Four Gospels* (1863-8), *Holy Communion* (1868), etc.

Howard, the family name of the dukes of Norfolk and the earls of Arundel. The family is descended from Howard, or Hereward, who was living in the reign of King Edgar (957-973), and who was a kinsman of Duke Oslac, his son Leofric being the father of Hereward who was banished by the Conqueror, but was subsequently allowed to return. Among his descendants were Sir William Howard, chief-justice of the Common Pleas (1297-1308); Sir John Howard, admiral and captain of Edward III.'s navy in the north; Sir John Howard, first Duke of Norfolk, an eminent Yorkist, who was created earl-marshal of England (1483)—his son and heir, Thomas Howard, being created Earl of Surrey. He fell in the cause of Richard at Bosworth Field. Thomas, Earl of Surrey, being also attainted, lost his earldom, but was restored in 1489 as Duke of Norfolk and earl-marshal. He commanded the English forces at Flodden. Thomas, the third duke, was an eminent statesman, poet, and warrior. Thomas, the fourth duke, was attainted of high treason for his communication with Mary Queen of Scots, and beheaded (1572), when all his honours became forfeited. His eldest son, Philip, Earl of Arundel, however, inherited, in right of his mother, the feudal earldom of Arundel, and died a prisoner in the Tower (1595). In 1604 the dukedom was restored by Act of Parliament, in the person of Thomas, Earl of Arundel. See NORFOLK, EARL OF.

Howard, BRONSON (1842), American dramatist, is a native of Detroit. He is the author of a number of successful plays, of which several—including *The Henrietta* (1887), *Young Mrs. Winthrop* (1882), *Saratoga* (1870), *The Banker's Daughter* (1878)—have been seen in Britain. Three of his best plays are *Old Love Letters* (1878); *Aristocracy* (1892), a comedy; and *Shenandoah* (1889), a drama of the civil war.

Howard, CATHERINE (1521-42), fifth queen of Henry VIII., was granddaughter of the second Duke of Norfolk. Henry VIII. married her, Aug. 8, 1540, to the delight of the Romish party. The following year, evidence of the queen's unfaithfulness was laid before him. Catherine acknowledged incontinence before marriage, but asserted that she had been faithful to the king. All who were charged with hiding her guilt were either beheaded, hanged, or imprisoned for life, among the last being the old Duchess of Norfolk, Lord William Howard, and his wife. On Feb. 13, 1542, Queen Catherine and Lady Rochfort were beheaded within the Tower.

Howard, JOHN (1726-90), English philanthropist, born very probably in Hackney, London. Pitying the survivors of the great Lisbon earthquake (1755), he hastened to their aid; but the ship in which he sailed was captured by a French privateer, and Howard was taken to Brest and imprisoned. Returning to England on parole, he successfully negotiated an exchange for himself, and through his advocacy his fellow-prisoners were soon afterwards released by the French government. About 1756 Howard bought a residence at Cardington, Bedfordshire; and it was while acting as high sheriff for Bedfordshire that he became interested in the sufferings of the prisoners brought before him. This led him to visit the jails throughout England, to devise regulations for the better treatment of prisoners. He then visited various prisons in Europe, and died at Kherson in Russia. He published *The State of Prisons in England and Wales* (1777), to which, in 1780, he brought out an *Appendix*; and in 1789 he wrote an *Account of the Principal Lazarettos in Europe*. See *Memoirs and Records by Hepworth Dixon* (1854), and *Life by Stoughton* (1884); also *Correspondence of John Howard* (1855).

Howard, OLIVER OTIS (1830), American general, born at Leeds, Maine; distinguished himself at the first battle of Bull Run (1861), at Fair Oaks (1862), where he lost an arm, at Antietam (1862), Chancellorsville, Gettysburg, and Chattanooga (1863); accompanied Sherman to Knoxville, and commanded the army of Tennessee (1864). After the war he was a commissioner of the Freedmen's Bureau for settling the emancipated negroes, and in 1881-2 was superintendent of West Point. In 1867 he founded Howard University at Washington, and in 1895 Lincoln University at Cumberland Gap, Tennessee. He wrote *Chief Joseph, or the Nez-Perces* (1881);

General Zachary Taylor (1892); *Isabella of Castile* (1894); *Fighting for Humanity*; and *Henry in the War*.

Howard of Effingham, CHARLES, LORD. See NOTTINGHAM, CHARLES HOWARD, EARL OF.

Howe, ELIAS (1819-67), sewing machine inventor, was born at Spencer, Massachusetts, U.S.A. For many years he worked as a mechanic, and after two years (1843-5) of experimenting, succeeded in devising the lock-stitch sewing machine. For long he tried in vain to secure recognition for his invention, even in England, where in 1847 he sold his rights for £50.

Howe, GEORGE AUGUSTUS, VISCOUNT (17125-58), English military officer, fought in Flanders in 1746, and was brigadier-general in America in 1757. He introduced many disciplinary reforms among the troops, and was doing excellent work when he was killed in a skirmish with the French.

Howe, HENRY (1812-96), English actor, whose real name was Henry Howe Hutchinson, was born at Norwich; made his debut as 'Rashleigh Osbaldistone' (1834), acted with Macready at Covent Garden (1837), and was for forty years attached to the Haymarket. In 1881 he joined the Lyceum, accompanied Sir Henry Irving to America, and died there.

Howe, JOHN (1630-1705), Puritan divine, born at Loughborough, Leicestershire. He was domestic chaplain to Cromwell until the death of the protector. After the restoration he was ejected from Torrington under the Act of Uniformity (1662), and for eight years travelled about the country, preaching and writing. His first work, *The Blessedness of the Righteous* (1668), was followed three years later by his best-known work, *The Living Temple*. In 1670 he went to Antrim Castle as chaplain to Lord Massereene, returning to London (1676) as pastor of a dissenting chapel in Staining Lane. He next went abroad with Lord Wharton (1685); but the declaration for liberty of conscience induced him to return to England (1687), and he headed a deputation of dissenting ministers in presenting an address to William III. in the following year. Complete editions of his works were published in 1724; new edition 1862-3 (6 vols.). See H. Rogers's *Life of John Howe* (1836); E. Calamy's *Life of John Howe* (1837); R. F. Horton's *John Howe* (1895).

Howe, JULIA WARD (1819), American writer and philanthropist, born at New York; married Dr. S. G. Howe (1843), and has been associated with him in editing the *Boston Commonwealth*, an anti-slavery journal,

and in his philanthropic work generally. She is well known in America as a writer and lecturer on social subjects. Her poetry includes *Passion Flowers* (1854), *Words for the Hour* (1856), *Later Lyrics* (1866), and *From Sunset Ridge* (1899). Her finest poem is 'The Battle-hymn of the Republic.' She has also written *Sex and Education* (1874), *Modern Society* (1881), *Life of Margaret Fuller* (1883), and a couple of dramas. See her *Reminiscences*, 1819-99 (1900).

Howe, RICHARD, EARL (1726-99), English admiral, was second son of the second Viscount Howe. In 1756 he bore a part in the capture of the *Alcide* and the *Lys*, and was with the expedition to Basque Road in 1757, and in the battle of Quiberon Bay in 1759. In 1762, when he represented Dartmouth in Parliament, he joined the Board of Admiralty; and in 1765 he was made treasurer of the navy, an office which he retained until 1770. In 1776 he went to N. America, and forced the passage of the Delaware (1777). After very ably effecting the relief of Gibraltar, he returned to England to become, from 1783 to 1788, First Lord of the Admiralty. On 'the glorious first of June, 1794,' off Ushant, he inflicted a crushing defeat upon the French, from whom he took six ships. In 1796 he was made admiral of the fleet. See *Life by Barrow* (1837).

Howe, SAMUEL GRIDLEY (1801-76), American philanthropist, born at Boston; served (1824-30) as surgeon during the Greek war of independence; and in 1831 came to Europe to study methods of educating the blind. On his return to Boston he helped to found, and afterwards directed, the Perkins Institution for the Blind, and an institute for idiots. In 1851 he founded the anti-slavery paper the *Daily Commonwealth*. See Julia Ward Howe (his widow), *Memoir of Dr. Samuel Gridley Howe* (1876); F. B. Sanborn's *Dr. S. G. Howe* (1890).

Howe, WILLIAM, FIFTH VISCOUNT HOWE (1729-1814), English general, was born in London. He served under Wolfe at Quebec (1759-60), where he led the forlorn hope at the Heights of Abraham; was present at the siege of Havana (1762), and was in command at Bunker Hill (1775). He won the battles of Long Island, Whiteplains, Brandywine, and captured New York (1776). He condemned the action of the government towards the colonies, resigned his command (1778) on account of remarks passed on his policy, and demanded an inquiry, which vindicated his conduct. See Howe's *Narrative before a Select Committee of the House of Commons* (1780).

Howell, JAMES (?1594-1666), British author, born at Abernant, Carmarthenshire. He became secretary to Lord Scrope (1626) and others; M.P. for Richmond, Yorkshire (1627); clerk to the council at Nottingham (1642). Imprisoned for debt (1643), on his release (1651) he devoted himself to historical and political pamphleteering, and the production of literary and philological essays. He is seen at his best in his *Epistolæ Ho-Eliaŋæ* (1645-55). He was appointed historiographer royal in 1661.

Howells, WILLIAM DEAN (1837), American novelist and author, born at Martin's Ferry, Ohio. In 1860 he wrote a *Life of Lincoln*, at that time a candidate for the presidency, and was connected (1866-81) with the *Tribune*, *Times*, and *Nation* of New York, and from 1871 to 1881 edited the *Atlantic Monthly*.

ature and Life (1903), and *London Films* (1905).

Howitt, MARY (1799-1888), in addition to what she did in collaboration with her husband, William Howitt, wrote dainty children's lyrics and other poems, as well as some notable fiction, including *Heir of Wast Wayland* (1851), and *Wood Leighton* (1836). Mrs. Howitt also worked with her husband on the *Forest Minstrel* (1823); *Desolation of Eyam* (1827); *Book of the Seasons* (1831); *Literature and Romance of Northern Europe* (1852); *Stories of English and Foreign Life* (1853). See *Mary Howitt*, an autobiography, edited by her daughter (1889).

Howitt, WILLIAM (1792-1879), English author, was born at Heanor, Derbyshire. Settling in Nottingham, he gained wide popularity with the annuals, *The Literary Souvenir*, *The Amulet*, etc. In 1840 he and his wife

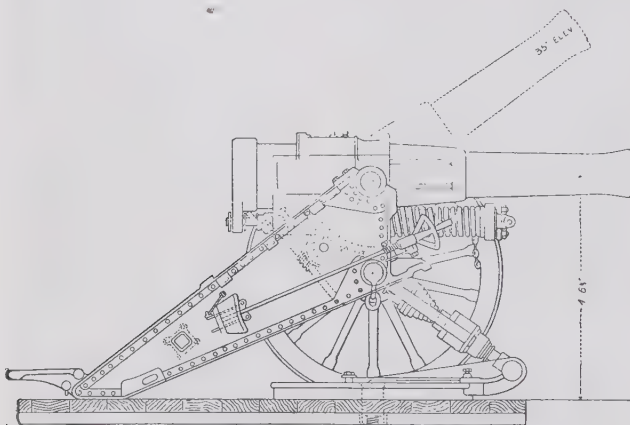
and *Castles of Great Britain and Ireland* (1862-4); *History of the Supernatural* (1863); *The Mad War-Planet and other Poems* (1871).

Howitzers differ from ordinary guns in being shorter and of lighter construction. They are used to fire heavy shells at a high angle of elevation, with a small muzzle velocity. Howitzers, with their indirect or curved fire, can effectually search cover, and with their large shells carry out demolitions at a distance. For armoured defences, however, direct-firing guns of 6-inch calibre and higher are necessary. By being able to fire over the head of attacking troops up to the moment of assault, they can be utilized in overcoming the difficulties of an advance under fire. The present British service 5-inch howitzer of 9 cwt. throws a 50-lb. shell containing 10 lbs. of lyddite with a muzzle velocity of 782 feet per second, while the projectile of the corresponding field-gun does not exceed from 14 to 16 lbs. in weight. The 6-inch siege howitzer of 25 cwt. is sufficiently mobile to be drawn by horses, and fires a shell weighing over 120 lbs. In order to obtain a great destructive effect, the shells of howitzers are filled with a high explosive such as melinite or lyddite.

Howling Monkeys, or HOWLERS (*Myceles*), are New World monkeys belonging to the family Cebidae. They are most abundant in Brazil, but also extend into Central America. The popular name is given on account of the extraordinary howling to which the animals give utterance; it is produced by means of a large expansion of the hyoid bone, placed at the top of the wind-pipe. All the howlers have prehensile tails, whose under-surface is naked at the tip. The thumb is well developed, and the naked face is surrounded by a fringe of long hair. The food is stated to consist entirely of leaves.

Howorth, SIR HENRY HOYLE (1842), English author, was born at Lisbon. He was called to the bar (1867), and represented S. Salford in Parliament (1886-1900). He is the author of *A History of the Mongols* (1876-88), *The Mammoth and the Flood* (1887), *The Glacial Nightmare and the Flood* (1893), etc. His geological works were chiefly directed against the development of the views held by Hutton and Playfair regarding the Glacial period.

Howrah, tn., opposite to, and practically a suburb of, Calcutta, India, on r. bk. of Hugli; with jute and oil mills, iron foundries, government engineering college, and botanical gardens. Pop. (1901) 157,594.



6-inch Howitzer.

Then he was an editor of *Harper's Magazine* and of the *Cosmopolitan*. He is best known as a novelist, but he has also written poems, books of travel, biographical and literary essays, and a number of short comedies. His chief works are: *Poems* (1873-86 and 1895); the novels, *The Kentons* (1902), *Ragged Lady* (1899), *A Hazard of New Fortunes* (1889), *The Minister's Charge* (1887), *Indian Summer* (1886), *The Rise of Silas Lapham* (1885), *A Woman's Reason* (1883), *A Modern Instance* (1882), *The Lady of the Aroostook* (1878), *A Foregone Conclusion* (1875), *Their Wedding Journey* (1871), *Their Silver Wedding Journey* (1899); the general works, *Tuscan Cities* (1886), *Modern Italian Poets* (1887), *Criticism and Fiction* (1891), *A Traveller from Atruria* (1894), *Literary Friends and Acquaintance* (1901), *Heroines in Fiction* (1901), *Liter-*

went to Heidelberg. One result was Howitt's delightful *Student Life in Germany* (1841); another was Mrs. Howitt's translation of the novels (1842-63) of the Swedish novelist Frederika Bremer; and a third was their common product, the *History of Scandinavian Literature* (1852). In 1846 Howitt was associated in the ownership and the management of the *People's Journal*, which was ultimately amalgamated with *Howitt's Journal*, started in 1847. Both withdrew in middle life from the Society of Friends, Howitt ultimately becoming a spiritualist, and Mrs. Howitt a Roman Catholic. Both died at Rome. Howitt's descriptive writing has ease, vigour, and verisimilitude. Besides the works mentioned, he wrote *Homes and Haunts of the most Eminent British Poets* (1847); *Cassell's Popular History of England* (1856-62); *Ruined Abbeys*

Howson, JOHN SAUL (1816-85), dean of Chester, born at Giggleswick-in-Craven, Yorkshire; became principal of Liverpool College (1849). This he resigned to be vicar of Wisbeach (1866), and in 1867 was appointed dean of Chester. He was the author of sermons and other religious works, and collaborated with the Rev. W. J. Conybeare in the production of the *Life and Epistles of St. Paul* (1852).

Howth, penin., Ireland, on N. side of Dublin Bay, rises seawards to a rocky height (Hill of Howth, 563 ft.). The town is on the N. side, 8½ m. N.E. of Dublin, and is a favourite summer resort and a chief fishing-station. The abbey is a picturesque ruin. Pop. (1901) 1,166.

Höxter, tn., Prussian prov. of Westphalia, on the Weser, 37 m. by rail N.E. of Paderborn; has timber houses of the 16th century, and 14th and 15th century buildings. Pop. (1900) 7,625.

Hoxton. See LONDON.

Hoy, the second largest isl. of the Orkney group, Scotland, 1½ m. S.W. of Pomona or Mainland. It is 14 m. long, and varies in breadth from ½ m. to 6½ m. Its area is 53 sq. m. The Atlantic coast is precipitous. Ward Hill (1,564 ft.) is the highest in the Orkney group. At the S. end there is a good natural harbour known as Long Hope. The Old Man of Hoy, an isolated pillar rock of yellow and red sandstone, with arches underneath, rises to 450 ft. The Dwarfie stone, 2 m. from the summit of Ward Hill, is about 6 ft. high, and has three hollow chambers. The stone is referred to in Scott's *Pirate*. Pop. (1901) 1,216.

Hoylake, tn., on Irish Sea, near estuary of the Dee, 8 m. W. of Birkenhead, Cheshire, England. Hoylake contains the residences of many Liverpool business men, and the links of the Royal Liverpool Golf Club. Pop., including W. Kirby (1901), 10,911.

Hoyland, Nether, tn., W. Riding, Yorkshire, England, 3½ m. S.S.E. of Barnsley; has coal mines, and brick and tile works. Pop. (1901) 12,464.

Hoyle, EDMOND (1672-1769), writer on whist and other games. He gave lessons in whist, and is mentioned by Fielding and Byron. His *Short Treatise on Whist* (1742) has run through many editions, but his rules have now been superseded. He wrote also a book on *Quadrille, Piquet, Backgammon, and Chess* (1761).

H.P., horse-power.

H.-P., half-pay.

H.R.H., His or Her Royal Highness.

Hroswitha (?935-?1000), German poetess, was born of a noble Saxon family, and entered the

Benedictine nunnery of Gandersheim, Brunswick, where she died. Hroswitha wrote eight metrical legends, including that of *Theophilus*, the mediæval *Faust*; also six comedies in prose, in the style of Terence, but aiming at the transformation of heathen into Christian poetry and the inculcation of chastity. Hroswitha's *De Gestis Imperatoris Ottonis I.* celebrates in hexameters the exploits of the Emperor Otto I. Another poem, *De Primordiis Cænobii Gandersheimensis*, narrates the history of Gandersheim nunnery from its beginning down to 919. There is a complete edition of Hroswitha's works by K. A. Barack (1853). The comedies are done into German by Bendixen (1850-3). *Otto I.* has been

the Yang-tse-kiang, accounts for its rise and present importance. Pop. over 600,000.

Hsü-chau-fu. See SUI-FU.

Huai-an, or HWAI-AN-FU, city, Kiang-su, China, on the Grand Canal, 100 m. N.N.E. of Nanking; a great entrepôt of salt.

Huaina-capac, HUAYNA-CAPAC, or COAPCA (c. 1450-1525), one of the greatest of the Incas of Peru, and during whose reign the empire attained its greatest splendour. He was succeeded by his sons Huascar and Atahualpa, the latter of whom lost the kingdom to Pizarro (1532). See PERU and INCAS.

Huallaga. See AMAZONS and PERU.

Huamanga. See AYACUCHO.

Huambisa, S. American half-



The Old Man of Hoy.

[Photo by Valentine.]

metrically translated into German by W. Gundlach (1894). See *Hroswitha*, by Ed. Dorer (1857).

H.S.H., His or Her Serene Highness.

Hsi-an-fu, or SI-NGAN-FU, cap. of Shen-si, China, on the R. bk. of the Wei-ho, 75 m. above its confluence with the Hwang-ho.

Hsiang, riv., a very important affluent of the Yang-tse-kiang in Hu-nan, and one of the main routes to Kwang-tung from Central China. A short canal connects its W. branch with the Kwei-kiang in Kwang-si.

Hsiang-tan, dist. and tn., Hunan, China, at the head of junk navigation on the Hsiang R., some 300 m. N. of Canton. The transshipment of produce *en route* to Canton, and of coal on its way to

breeds, a branch of the Jivaro nation, who are dominant on the Upper Marañon and Santiago rivers. The Huambisas betray in their light complexion and full beards their mixed descent from the Indians and some seven thousand Spanish women captured by them at the sack of Sevilla del Oro in 1599.

Huanaco. See GUANACO.

Huancavelica, or GUANABELICA, dep. Peru, in the Andes; has an area of 9,251 sq. m., and in 1896 a pop. of 223,796. The department contains little land fit for agriculture. The mountains are rich in minerals, but owing to difficulty of transport little mining is carried on. Its capital is Huancavelica, 150 m. S.E. of Lima. Pop. about 8,000.

Huanchaca, the most important silver-mining tn. in Bolivia, 320 m. from Antofagasta. Alt. 13,470 ft.

Huang-ho. See **YELLOW RIVER.**

Huanuco, or **GUANUCO.** (1.) Department, Peru, with mining and agriculture. Area, 14,024 sq. m. Pop. (1896) 145,309. (2.) Capital of dep. Huanuco, about 170 m. N.N.E. of Lima, in the valley of the Rio Huallaga, with plantations of coffee, cotton, and sugar. Gold, silver, and copper are mined in the vicinity. It is a bishop's see. Pop. about 7,500.

Huaraz, cap. of dep. Ancachs, Peru, 180 m. by rail N.W. of Lima. Pop. about 17,000.

Huascar, a Peruvian ironclad (1,870 tons). In 1877 she was employed by revolutionists in semi-piratical operations, and was attacked off Ilo by two British warships, but was neither taken nor disabled. Subsequently she surrendered to the government of Peru, which employed her in the war with Chile that began in 1879. After various exploits, she was captured at the action off Angamos on Oct. 8, 1879. See **ANGAMOS.**

Huber, **FRANÇOIS** (1750-1831), Swiss naturalist, was born at Geneva. By the aid of his wife and his secretary, F. Burneus, although he had lost his eyesight in his youth, he studied the habits of bees, and the results were given to the world in his *Nouvelles Observations sur les Abeilles* (1792; new Eng. ed. 1821). — **PIERRE HUBER** (1777-1840), his son, devoted himself to the study of ants, and in 1810 published *Recherches sur les Mœurs des Fourmis indigènes* (1810; Eng. trans. 1820).

Huber, **JOHANN NEPOMUK** (1830-79), German writer on philosophy and theology, was born at Munich, where he became professor (1864), and identified himself with the Old Catholic movement. His *Die Philosophie der Kirchenväter* (1859) was placed upon the Index. He also wrote *Der Jesuitenorden nach seiner Verfassung* (1873), which was also put upon the Index.

Hubert, **ST.** (656-727), was a son of a duke of Guienne; lived at the court of Pippin of Herstal, and was made bishop of Liège (properly Mestricht). He is the patron saint of hunters. His day is November 8.

Hubli, tn., Dharwar dist., Bombay Presidency, India, 15 m. S.E. of Dharwar; is a centre of the cotton industry. Pop. (1901) 58,149.

Hübner, **EMIL** (1834-1901) German philologist and archaeologist, was born at Düsseldorf. In 1863 he was appointed professor of classical philology in the university of Berlin. He travelled

in many parts of Europe, making archaeological investigations and paying particular attention to ancient inscriptions. Among his publications are works on Latin inscriptions in Spain and in Britain, on Latin grammar, on philology, and on the history of Latin literature.

Hübner, **JOSEPH ALEXANDER**, COUNT (1811-92), Austrian diplomatist, was born in Vienna. From 1849 to 1859 he was ambassador at Paris, and from 1865 to 1867 ambassador at Rome. He represented Austria at the Congress of Paris in 1856. Hübner was a very interesting and observant writer. Works: *Siatus v.* (1872); *Ein Spaziergang um die Welt* (1872); *Durch das britische Reich, 1853-4* (1886); *Ein Jahr meines Lebens, 1848-9* (1891).

Hübner, **RUDOLF JULIUS BENNO** (1806-82), German painter, was born at Oels in Silesia, and belonged to the Düsseldorf romantic school, painting sacred and historical subjects. Two of his best known pictures are *Samson overthrowing the Pillars* (1832), in Berlin, and *Luther disputing with Eck* (1866), in Dresden. He was director of the Dresden Gallery from 1871 until his death, and also was professor of painting. He published a *Catalogue of the Dresden Museum*, with a valuable introduction (5th ed. 1880).

Huc, **ÉVARISTE RÉGIS** (1813-60), Roman Catholic missionary and traveller, was born at Toulouse, and went as a missionary to China. In 1844, with two companions, he left Peking for Tibet, and in 1846 succeeded in reaching Lhasa. Though favourably received by the regent, he and his companion Gabet had hardly begun their missionary work when, at the instigation of the Chinese ambassador, they were conveyed back to Peking. He wrote *Souvenirs d'un Voyage dans la Tartarie, le Tibet, et la Chine* (1851-2); *L'Empire Chinois* (2 vols. 1855); and *Christianisme en Chine* (1857).

Huchieson. See **SCOTLAND**—*Vernacular Language and Literature.*

Huckaback, a very coarse species of linen fabric, much employed for making face towelling. The material is figured all over like damask, but with a small repeating or diaper pattern, and is very soft and absorbent.

Huckleberry. See **WHORTLEBERRY.**

Hucknall Torkard, tn. and par., Nottinghamshire, England, 6 m. N.W. of Nottingham; has coal mines and manufactures of hosiery. Lord Byron is buried in the parish church. Pop. (1901) 15,250.

Huddersfield, munic. co. and parl. bor., W. Riding of York-

shire, 16 m. S.W. of Leeds, and on the Huddersfield and Ramsden Canal (23½ m. long). The church of St. Peter, founded about 1100, was rebuilt in 1836. Other public buildings include the Cloth Hall (1875), town hall, technical college, public library, and art gallery. There are three parks. The staple manufacture is woollen goods, chiefly fancy materials, and mixed worsted, silk, and cotton goods, and there are large iron foundries and manufacture of machinery. It returns one member to the House of Commons. Pop. (1901) parl. bor. 96,383; co. bor. 95,047.

Hudson. (1.) City and river port, Columbia co., New York, U.S.A., on l. bk. of Hudson R., 28 m. S. of Albany. There are manufactures of machinery, stoves, furnaces, tobacco, beer, and knitted goods. Pop. (1900) 9,528. (2.) Town, Middlesex co., Massachusetts, U.S.A., 28 m. W. of Boston; has manufactures of boots and shoes. Pop. (1900) 5,454. (3.) River of New York, U.S.A., rising in the Adirondack Mts., and flowing nearly S. to New York harbour. It is tidal, and navigable to Albany, 140 m. from its mouth. Its total length is 300 m., and its drainage basin, including the Mohawk, a large W. branch, is 13,366 sq. m. Its scenery is exceedingly beautiful, and on its banks are many places of historic and literary interest; hence its title of the 'Rhine of America.' The Palisades are a great dyke of trap rising sheer from the water's edge from 300 to 500 ft., and fringing the W. shore for 18 m. near its mouth. It was first explored in 1609 by Henry Hudson. (4.) Strait. See **HUDSON BAY.**

Hudson, **GEORGE** (1800-71), English railway promoter, known as the 'railway king,' was born at Howsham, Yorkshire. Before thirty he had acquired a fortune, and became lord mayor of York (1837). Giving his attention to railway schemes, he subscribed large sums as capital, and exercised great controlling influence on railway enterprise (1844-5). He was M.P. for Sunderland (1845-59). Carlyle called him the 'big swollen gambler.' He died comparatively poor.

Hudson, **HENRY** (d. 1611), English navigator, made voyages (1607, 1608, 1609, 1610) to discover the north-east and north-west passages, first for the Muscovy Company, and afterwards for the Dutch East India Company. In the 1609 voyage he explored Hudson R., U.S.A., and on the last voyage, when he discovered Hudson Bay, his crew mutinied and sent him adrift in a small boat, and he was never seen again. See *Henry Hudson, the Navigator*, ed. Hakluyt Society (1860).

Hudson Bay, inland sea on the N.E. coast of N. America, is enclosed almost completely within Canadian territory, except on the N. and N.E., where Fox Channel connects it with the Arctic Ocean, and Hudson Strait (500 m. long) with the Atlantic. It receives the drainage of the Nelson, Churchill, Severn, and other rivers, and has an area of 500,000 sq. m. Its length is 850 m., and its breadth 600 m.; average depth, about 70 fathoms. The E. shores are rocky, the W. shores generally flat. On the S. it contracts into the shallower and narrower James Bay. It was discovered by Henry Hudson in 1610. The bay is not frozen except for some 10 m. from the shore, but the straits are blocked with Arctic drift-ice for nearly ten months of the year. The safe navigation season lasts in the straits from the middle of July to the beginning, perhaps the middle, of October. Recent experiments, however, tend to show that the passage can be kept open for a longer period, and it is expected that this direct access by sea to the centre of Canada will result in large exportations of wheat by this route. A railway is under construction from Sault Ste. Marie, at the outlet of Lake Superior, to Moose Factory on James Bay.

Hudson Bay Territory. See NORTH-WEST TERRITORIES.

Hudson's Bay Company was founded in 1670 by Prince Rupert and others to engage in the fur trade with the North American Indians. The addition of Canada to the British dominions opened the way for adventurers from the Great Lakes; and the success of these adventurers led to the formation in 1783 of the North-West Fur Company of Montreal, between whose agents and those of the Hudson's Bay Company there were many struggles, often sanguinary in character. The two rivals joined forces in 1821, and in 1838 the Hudson's Bay Company obtained a practical monopoly of the region they exploited; but it was abolished in 1859. Finally their territorial and other rights were bought out by Canada for £300,000, and every twentieth section of land in the fertile belt was allotted them. The company still continues its fur-trading, and many of its stores have developed into great modern emporiums—e.g. Winnipeg and Calgary. See *Willson's The Great Company* (1900).

Hué, cap. of Annam, French Indo-China, on the Hué R., 9 m. from the sea. The citadel contains the king's palace. The residential quarter lies E. of the citadel. The French captured the forts at the mouth of the river in 1863. Pop. (1901) over 50,000.

Hueffer, FORD MADDOX (1873), English author, has published *The Brown Owl* (1892); *Life of Maddox Brown* (1896); *Poems for Pictures* (1900); *The Cinque Ports* (1900), with Joseph Conrad; *The Inheritors* (1901); *Romance* (1903); *The Pace of the Night* (1904); and *The Benefactor* (1905).

Hueffer, FRANCIS (1845–89), English writer on musical subjects and librettist, born at Münster in Westphalia; settled in London (1869). From 1879 until his death he was critic to the *Times*. Hueffer was perhaps the first in England to advocate the claims of Wagner. He translated the *Cor-*

Huelva. (1.) Province of S. Spain, forming part of the ancient kingdom of Seville. The wealth of the province is chiefly found in the copper mines of Rio Tinto, Tharsis, Buitron, etc. Area, 3,913 sq. m. Pop. (1900) 260,880. (2.) Capital of above prov., between mouths of the Guadalquivir and Guadiana, 427 m. W. of Madrid; the port for the Rio Tinto mines (exports, 550,300 tons in 1903). It is a progressive place, with good harbour, much frequented for sea-bathing in summer, and as a climatic resort in winter. Among the notable churches is that of San Pedro,



Hudson Bay.

respondence of Wagner and Liszt into English (1888); wrote *Half a Century of Music in England* (1837–57); *The Troubadours: a History of Provincial Life and Literature in the Middle Ages* (1878); *Richard Wagner, or the Music of the Future* (1874); and wrote the libretti of Mackenzie's *Colomba* (1883) and Cowen's *Sleeping Beauty* (1885).

Huehuetenango, dep., Guatemala, Central America; is mountainous. Coffee, sugar, wheat, and oats are cultivated, and some lead is mined. Area, 5,700 sq. m. Pop. 120,000. The cap. is Huehuetenango, on Chiapas R., 103 m. N.W. of Guatemala.

once a Moorish mosque. A Roman aqueduct still supplies the city with water. Pop. (1900) 21,359.

Huercal Overa, tn., prov. Almeria, Spain, 40 m. N.E. of Almeria; has manufactures of soap, table linens, and lace. Pop. (1900) 15,763.

Huerta, VICENTE GARCIA DE LA (1730–87), Spanish poet, born at Zafra (Extremadura); became chief librarian of the royal library. He was a violent opponent of the movement to displace the old national drama by imitations of the French classic stage. His own play, *Raquel* (1778), which had great success, was entirely in the French manner. He issued

his poems in 1778 in two volumes, and in 1785 published a collection, in fifteen volumes, of old Spanish plays, *Teatro Español*.

Hues, or **HUSINS**, **ROBERT** (1553-1632), English geographer, was born at Little Hereford, in Hertfordshire. Probably he sailed with Cavendish to Virginia in the company of Sir Richard Grenville, and he certainly accompanied Cavendish to the southern hemisphere in 1591 and 1592. He was the author of *Tractatus de Globis et eorum Usu* (1594; Eng. trans. by Chilmead). It was edited, with notes, by Sir Clements Markham for the Hakluyt Society in 1889. Hues also wrote a *Breviarium Orbis Terrarum* (1667).

Huesca. (1.) Prov., N. Spain, forming part of ancient realm of Aragon. It is largely covered with thickly-wooded mountains, crowded with game of all sorts; but in the valleys wine, silk, fruit, and grain are raised.—The mineral baths of Estadilla and Panticosa are in the province. Area, 5,850 sq. m. Pop. (1900) 244,867. (2.) City (Lat. *Oscá*), prov. Huesca, Spain, 40 m. N.N.E. of Saragossa. It is an ancient city, formerly a residence of Moorish kings and of those of Aragon. Many ancient buildings still remain, and the streets are narrow and crooked. Here Sertorius, the Ibero-Roman rebel, set up his university. Pop. (1900) 12,626.

Huescar, city, prov. Granada, Spain, 65 m. N.E. of Granada. Pop. (1900) 7,763.

Huet, **PIERRE DANIEL** (1630-1721), French scholar and churchman, born at Caen; became famous for the wide range of his knowledge. Appointed assistant tutor (with Bossuet) to the dauphin, he edited, with Madame Dacier, the celebrated Delphin classics. In 1689 he became bishop of Avranches, but resigned the see in 1699 on becoming abbot of Fontenay. In 1701 he retired to Paris, where he died. Among his many works may be mentioned an edition of *Origene* (1767), *Demonstration Evangelique* (1679), *Histoire du Commerce et de la Navigation des Anciens* (1717), and *Traité philosophique de la Faiblesse de l'Entendement humain* (1723). See *Autobiography*, in Latin (1713); and *Life* by Bartholmess (1850).

Hufeland, **CHRISTOPH WILHELM** (1762-1836), German physician and writer on medicine, born at Langensalza in Thuringia; became professor of medicine at Jena, and in the University of Berlin (1809). His best-known works are his *Makrobiotik*, or 'The Art of Prolonging Life' (8th ed. 1889), and his *System der praktischen Heilkunde* (10th ed. 1857).

Hug, **JOHANN LEONARD** (1765-1846), Roman Catholic theologian

and Biblical critic, was born at Constance, and from 1790 to 1845 was a professor in the University of Freiburg, at first of Oriental languages and Old Testament exegesis, and later of New Testament exegesis. Hug was one of the highest authorities on the history of the New Testament, but many of his conclusions have now been superseded. His *Introduction to the New Testament* was translated into English in 1827.

Huggins, **SIR WILLIAM** (1824), English astronomer, born in London. In 1856 he erected a private observatory at his home at Upper Tulse Hill, near London. He may be regarded as the chief founder of the science of astrophysics, or spectroscopic astronomy, having been stimulated by the researches of Bunsen and Kirchhoff, which he developed with remarkable acumen and zeal over a long period. He was president of the Royal Astronomical Society (1876-8), president of the British Association (1891), president of the Royal Society (1900). In 1902 the Order of Merit was conferred upon him. Author, with Lady Huggins, of *An Atlas of Representative Stellar Spectra*.

Hughenden, par., amidst picturesque woodland scenery, 2 m. N. of High Wycombe, Buckinghamshire, England; was the home of Disraeli. Pop. (1901) 1,728.

Hughes, **ANNIE**, English actress, made her first appearance upon the stage in 1885 in the *Private Secretary*. In 1887 she showed a decided gift for comedy as Susan McCreery in *Held by the Enemy*. Two excellent but widely different impersonations were her Nancy in *Sweet Nancy* (1890), and the coster flower-girl in *A Bit of Old Chelsea* (1897). She has also made successful appearances in *Rosemary* (1896), *The Brixton Burglary* (1898), *Mrs. Wiloughby's Kiss* (1902), and *Lorna Doone* (1903).

Hughes, **DAVID EDWARD** (1831-1900), Anglo-American inventor, born in London, but emigrated to the United States, and in 1850 became a professor of music, and subsequently of natural philosophy, both at Bardstown College, Kentucky. In 1855 he patented his type-printing telegraph instrument, which was largely adopted in the United States and in Europe. He also invented the microphone (1878) and the induction balance (1879).

Hughes, **SIR EDWARD** (?1720-94), English admiral who served under Vernon at Porto Bello in 1739, and while commander-in-chief in the East Indies (1778-83) fought various actions with the French under De Suffren. He became an admiral in 1793.

Hughes, **HUGH PRICE** (1847-1902), Wesleyan minister, born

at Carmarthen, Wales, and, after being appointed to the West London Mission, conducted services at St. James's Hall, and superintended philanthropic and mission work. He edited the *Methodist Times*, and in 1898 was elected president of the Conference. Hughes was an advanced Methodist, and was a very hard worker. See *Hugh Price Hughes as We Knew Him* (1902), and *Life* by his daughter (1904).

Hughes, **THOMAS** (1822-96), English author, born at Uffington, Berkshire; joined (1848) the Christian socialist movement under F. D. Maurice and C. Kingsley, and was one of the founders and principals of the Working Men's College, London. He published, anonymously, *Tom Brown's School Days* (1857), which was an instant success, and *Tom Brown at Oxford* (1861). He sat in Parliament as a Liberal from 1865 to 1874, and presided at the first Co-operative Congress (1869). A project (1879) to establish a model community at Rugby, Tennessee, resulted in heavy pecuniary loss.

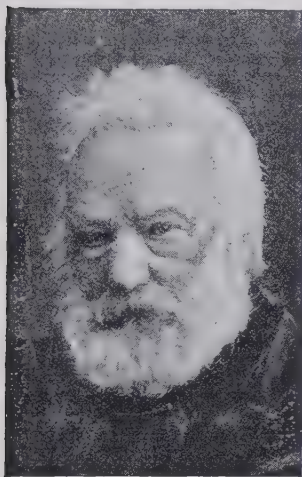
Hugh of Avalon, Sr. (?1135-1200), bishop of Lincoln, born at Avalon, Burgundy, and entered the Grande Chartreuse. Henry II. of England installed him as prior of Witham monastery, Somerset, and thence promoted him to the see of Lincoln (1186). There he initiated numerous reforms, and was famed for charitable actions. Hugh was canonized in 1220. See Canon Perry's *Life of St. Hugh* (1879), and the *Magna Vita* (written probably by his chaplain, Adam of Evesham), which has been edited by Rev. J. F. Dimock (1864).

Hugh of Lincoln, a boy of that city who is alleged to have been crucified (1255) by the resident Jews in mockery of Christ's death. It was also declared that the Jews desired to use the boy's blood in their paschal celebrations, a belief which, however absurd and ill-founded, prevailed all through the middle ages in all parts of Europe, and has persisted down to the present day, at all events in Hungary, where a young Christian girl was alleged to have been treated, at Tisza-Eszlar (1883), in the same way as the boy Hugh of Lincoln. The story was a favourite ballad subject, and supplies the framework of Chaucer's *Prioresses Tale*.

Hugh Town, tn. on St. Mary's, Scilly Islands, Cornwall, England; has a good harbour.

Hugli, or **HOOGLY**. (1.) Capital of the district of Hugli, Bengal, India, 25 m. N. of Calcutta. Hugli is said to have been founded in 1537 by the Portuguese. Pop. (1901) 29,383. The district, which has an area of 1,223 sq. m.,

is flat, with a gradual rise to the N. and N.W. The scenery is strikingly beautiful, the district being covered with orchards and gardens, interspersed with villages and temples. Pop. (1901) 1,049,282. (2.) The most westerly of the deltaic arms of the Ganges, India; flows 120 m. almost due s. to Calcutta, where it inclines to the s.w., and empties itself into the Bay of Bengal. Quicksands and shifting banks necessitate the employment of specially trained pilots for the navigation of vessels to Calcutta, which is situated at about eighty miles from its mouth. A bore of seven feet often ascends the river at a rate of twenty-two miles an hour during the south-west monsoon.



Victor Marie Hugo.

(Photo by P. Nadar.)

Hugo, VICTOR MARIE (1802-85), the greatest among French poets, born at Besançon. Young Victor began to write at the age of fourteen, and before his twentieth year he had gained several prizes for poems. He was then a royalist; and his *Télégraphe*, a poem written in 1819, attracted the notice of the king. Hugo was founder and chief editor of a literary supplement to *La Conservateur*, one of the reactionary journals of that date; it came to an end in 1821. But Victor Hugo's true literary career began with the publication of his first volume of poetry, *Odes et Poésies*, in 1823, after which he was acknowledged as one of the most promising young literary men of the day. In 1823 he published *Han d'Islande*, his first romance, a book altogether romantic and extravagant, with a great leaning to horrors and to melodrama. The year 1823 may be looked upon

as the opening of the campaign between the romanticists and the classicists in France. Hugo, who at first professed to hold a middle place, was irresistibly pushed by his pre-eminence into the championship of the new romantic movement. It was as editor of *La Muse Française* (1823-4) that he first took part in the warfare which in 1830 he brought to a climax by putting on the stage his drama *Hernani*. In the interval he published a second volume of *Odes* (1824); was made a chevalier of the Legion of Honour (1825); published in that same year a story, *Bug-Jargal* (written as early as 1818)—in his first novel he goes to Iceland for his hero, in his second among the negroes of San Domingo—and issued (1826) a third volume of verse, *Odes et Ballades*. In 1827 Hugo produced his first drama, essentially a romantic one, *Cromwell*, which was not a success (it is of very great length), and wrote two other plays which were not acted—*Amy Robart* and *Les Semeaux* (1828), posthumously published—and issued a volume of sketches in verse, *Les Orientales*, in 1829. These volumes of verse are half lyric and half epic, one of Victor Hugo's inventions in verse. Then followed *Hernani*, even to this day almost Victor Hugo's most celebrated work. Its production created quite a tumult, amid which the piece was scarcely heard. To the sober judgment of to-day it hardly seems worthy of so much enthusiasm or hostility. It is full of fine passages, but also ofrodomontade. Between 1830 and 1836 Hugo's fame rose to its highest point. He was friendly to the Orleanist dynasty, which came in with the revolution of 1830; and he was treated with great consideration by the court. In 1831 appeared *Notre Dame de Paris*, the most celebrated of his romances and perhaps his finest prose work, and a volume of verse, *Feuilles d'Automne*, verses which express better than any, except *L'Art d'Être Grand-père*, the domestic and tender sentiments of the poet. In the same year was played *Marion Delorme* (or *De Lorme*), which had been forbidden by the censor under the previous dynasty. *Le Roi s'amuse* followed in 1832, the best-motived perhaps of all Victor Hugo's plays. The tragedy is of the most poignant type possible, yet unforced; and the play retains that admixture of the grotesque which is one of the *cachets* of the French romantic school (compare Quasimodo in *Notre Dame*, and Gautier's *Albertus*), without being defaced thereby. *Le Roi s'amuse* had, however, produced a tumult at the theatre, and

its performance was forbidden; and this fact, in its turn, led to a trial: it has not at any time been very successful as a play, and is oftener seen in its operatic guise, *Rigoletto*, than as a drama. *Lucrèce Borgia*, Hugo's next play, had a greater initial success than any of his other pieces. *Marie Tudor* (1833) followed next. Both these are in prose. Hugo wrote, further, two prose works in 1833—*Mirabeau*, a study, and *Clair de Lune*, a sketch from life directed against capital punishment; and in 1835 was played his *Angelo*, *Tyran de Padoue*, also in prose, which fell flat. Then followed some volumes of poetry, which are more subjective than anything which Victor Hugo had yet published. Not, indeed, that the author of *Hernani* can be considered an objective writer in the sense that Shakespeare was, and indeed most of the Elizabethans were. Howbeit, in *Voix Intérieures* and *Les Rayons et les Ombres* we have the writer in a new mood—a subdued state of reflection, not one of declamation as heretofore. It is when his fervid speech is a little controlled, as in this class of verse, that Victor Hugo gives the world his finest poetry. Though, or because, he was the acknowledged leader of young literary France, Hugo was refused admission to the Academy in 1836, and not elected till 1841. Saving for one tragic event which greatly influenced his thought and verse—namely, the death in a boating accident of his newly-married daughter Léopoldine, and of her husband Charles Vacquerie—the poet's biography from this time to 1845 consists chiefly of the list of his productions: two dramas, *Ruy Blas* (1838) and *Les Burgraves* (1843), and a large book of travels and history, *Le Rhin* (1841). From 1845 politics engaged a considerable share of his activities. After the revolution of 1848 Hugo still sat as a Conservative, and was at the outset not unfavourable to the pretensions of Louis Napoleon. But the *coup d'état* (Dec. 1851), against which Hugo made vain efforts to raise the people, turned him into an exile and a convinced republican, tending, as the years went on, more and more towards socialism. In 1852 appeared his attack on the emperor, *Napoléon le Petit*, which was followed a year later by the *Châtiments*, a series of poems as bitter as were ever written. Victor Hugo at first made his home in Jersey; in 1855 he moved to Guernsey, and lived at Hauteville House. For fifteen years he remained an exile in the island, and only returned to France after the fall of the empire in 1870. After *Châtiments*, the chief literary events are—

the beginning of *La Légende des Siècles*, which without doubt, from its originality in form of versification and in the choice of rhymes, constitutes an epoch in the history of French poetry; the publication of *Contemplations*, one of his very finest works (part had been written long before); and the publication of those novels or romances of modern life of which *Les Misérables* (1862) is the most celebrated, others being *Les Travailleurs de la Mer* (1866), *L'Homme qui Rit* (1869), and *Quatre-vingt-treize*, written in France after his return, the two last being in a sense historical stories. They are examples not only of the immensely wide range of the writer's powers—versatility is too slight a word to use—but of his new outlook upon life, and his predilection for the poorer classes.

After his return to Paris in 1870, Victor Hugo reigned as the undisputed sovereign and, as it were, father of contemporary French literature. But only one or two more works from his pen of the first importance were to see the light. One of these is *L'Année Terrible*, a series of lyrics—as they must be called—arranged in an epic manner, and all illustrating the sufferings of Paris during the siege. Some critics place this poem or series of poems very high, but it hardly seems equal to the greatness of the subject. It lapses strangely into the commonplace, almost into bathos now and then, and one is sensible of a want of central fire. In 1877 he issued a second part of *La Légende des Siècles*, which, though not equal to the one published in 1859, yet takes a very high rank in Hugo's work; and this same year he also wrote his charming *L'Art d'être Grand-père*, which perhaps more than anything of Victor Hugo's made for his popularity with the middle-class public. *L'Histoire d'un Crime* (the coup d'état) is a political pamphlet of great force. A third and decidedly inferior part of *La Légende des Siècles* was published in 1883. The *Légende* was designed to be but one part of a trilogy. Of the other portions of this trilogy, fragments appear in *Dieu* and in *La Fin de Satan*, both published posthumously. *La Pitié Suprême* and *Religion et Religions* (1879-80) also belong to the concluding years of his life. We have to note one more drama, *Torquemada*, written in 1882, but not put upon the stage.

In French literature Victor Hugo takes a place analogous to, if far behind, the place which is held by Shakespeare in England and Goethe in Germany. If his defects could be summed up in a sentence, we should say

that his weakness lies in a predominance of the intellect over the emotions; thus Heine placed his finger on the spot when he said that Hugo was all fire without and ice within. This is a charge which touches French literature as a body—its love of rhetoric. In Hugo the weakness is betrayed most frequently by his addiction to antithesis; a modern critic has said of him that he is antithesis embodied. Add the too obvious planning, the too much of *volonté* in Hugo's work—for the evidence of 'scheme' is rarely a favourable sign in a writer—and it is easy to divine where his inspiration has its limits. On the other hand, his memory is prodigious, and what we may call the first-fruits of his imagination seemingly inexhaustible. No one has mastered the technique of verse as Hugo has done, and none has ever so piled image upon image, and run through the whole gamut of human experience in the present and the past. Hugo is often incorrect, and absurdly so; but there remains an immense residuum of real knowledge. We can understand why Swinburne admires Hugo beyond measure, for these two poets have a common love of profusion in imagery and allusion.

A final stereotyped edition of Victor Hugo's *Œuvres Complètes* was published in forty-seven volumes in 1880-5; to which must be added several volumes of *Œuvres Inédites* and of *Correspondance*, published since that date. All his works have been translated into English at different times. The work *Victor Hugo raconté par un Témoin de sa Vie* is generally considered to be in effect an autobiography. It is published uniformly with the stereotyped edition. See also A. C. Swinburne's *A Study of Victor Hugo* (1886); Renouvier's *Victor Hugo, le Poète* (1892); Nisard's *Souvenirs et Notes Biographiques* (2 vols. 1888).

Huguenots, the name generally given to the French Protestants of the 16th, 17th, and 18th centuries. The turning-points in their history were—(1) the outbreak of the civil religious wars in 1562; (2) the Edict of Nantes, by which toleration was guaranteed to them in 1598; (3) the revocation of the Edict of Nantes by Louis XIV. in 1685. They were placed on a footing of perfect equality with the rest of the population by the revolution of 1789. See, further, *FRANCE*.

Hula (*Heteralocha acutirostris*), a New Zealand bird in which there is remarkable sexual dimorphism. The female has a long, curved bill, and the male a short, stout one. The plumage is greenish black, the

tail being tipped with white. The bird is placed, with the rooks, in the family *Corvidæ*.

Hui-chau-fu, in An-hui, China, a prefecture in mountainous country; famous for its teas, green and black, known in Canton dialect as 'Fy-chow' teas.

Huilla, European colony on the Mossamedes plateau, Angola, Portuguese W. Africa, 85 m. N.N.E. of Mossamedes; is now in the hands of French missionaries, who make wine and liqueurs.

Huitzilopochtli, the Mexican war-god, though theoretically subordinate to the supreme deities, the sun and the moon, was in reality at the head of the Aztec pantheon. Three annual feasts—in May, July, and December—were celebrated in his honour with sanguinary and revolting human sacrifices, often amounting to 20,000 persons yearly.

Hu-kwang, the provs. of Hunan and Hu-peh, China, administered by a viceroy who resides at Wu-chang-fu. The name was introduced in the Yuan dynasty (1260-1341), when the province extended to the Gulf of Tong-king.

Hulke, JOHN WHITAKER (1830-95), British surgeon and geologist, born at Deal, Kent. During the Crimean war he served as assistant-surgeon at Smyrna and before Sebastopol (1855), afterwards becoming medical tutor at King's College Hospital, London. He was a specialist in ophthalmic science, and president of the College of Surgeons from 1893 until his death. He was also an eminent geologist.

Hull. (1.) Properly KINGSTON-UPON-HULL, a munic. and parl. bor., city (suffragan bishopric, 1891), and co. of itself, in E. Riding, Yorkshire, England, at the confluence of the Hull with the Humber, 42 m. E.S.E. of York. Holy Trinity Church dates from the 13th century, and St. Mary's Church is also ancient. Public buildings include the town hall, Trinity House, merchants' exchange, Royal Institution, public hall, public libraries, two museums, art gallery, etc. The Charterhouse Hospital dates from 1384; other charities are connected with the Trinity Guild, founded 1369. The docks have a water area of about 193 ac. The total imports in 1904 were valued at £31,858,730, and the total exports at £19,099,393. The manufacture of oil and oil cake is a special industry; others are flour-milling, shipbuilding, engineering works, iron foundries, tanneries, chemical works, breweries; and the fishery is valuable. The town was named Kingstown by Edward I. in 1293. Until late in the 19th century it was the headquarters of a whale fishery. It returns three members to the House of

Commons. Pop. (1901): munic. bor. 240,618; parl. bor. 239,876. (2.) Important lumber tn., Canada, Ottawa co., prov. Quebec, on the Ottawa R., just opposite Ottawa; has paper mills. It was swept by fire in 1900, but has since been rebuilt. Pop. (1901) 13,993.

Hull, EDWARD (1829), Irish geologist, born at Antrim, was appointed to the staff of the Geological Survey (1850), became director of the Geological Survey of Ireland and professor of geology in the College of Sciences, Dublin (1869-90). He investigated the geology of S. Palestine and of Arabia Petræa (1883), and in 1893 of parts of the Nile Valley. He has published *A Treatise on Building and Ornamental Stones* (1872), *The Coalfields of Great Britain* (5th ed. 1905), *Physical Geography and Geology of Ireland* (1891), *Volcanoes Past and Present* (1892), and *Our Coal Resources* (1897).

Hull, ISAAC (1773-1843), American naval officer, born at Derby, Connecticut. During the war of 1812 he acquired a great reputation for gallantry and seamanship, his crowning exploit being the capture (Aug. 19, 1812) of the British frigate *Guerrrière*. See *Life* by J. G. Wilson (1889).

Hull, WILLIAM (1753-1825), American soldier, uncle of Isaac Hull, born at Derby, Connecticut; entered the army, and fought with distinction through the war of independence. After the war he removed to Newton, Massachusetts, became major-general of Massachusetts militia, and was elected to the state senate. In 1805 he was made governor of Michigan territory, a position he held till the outbreak of the war of 1812, when he was sent to defend Detroit, but surrendering without having offered any resistance to the British, he was court-martialled and sentenced to death. The sentence was not carried out. See J. G. Wilson's *Life of Isaac Hull* (1889).

Hullah, JOHN PYKE (1812-84), musical reformer and composer, was born at Worcester, and was a pupil of the Royal Academy (1833). His system was widely taught. In 1850 St. Martin's Hall was opened to carry on the work, and here it was continued till the destruction of the building by fire (1860). Hullah was a professor at King's, Queen's, and Bedford Colleges, London; was inspector (1872) of training schools, and was an industrious composer. Hood's poem, *More Hullah-baloo*, deals humorously with his work. He wrote *Grammar of Vocal Music* (1843), *Musical Harmony* (1852), *Counterpoint* (1864), *History of Modern Music* (1862), etc. In 1886 his wife published a *Memoir* of him.

Hulme, FREDERICK EDWARD (1841), writer in natural history and archaeology, born at Hanley, Staffordshire; became professor at King's College, London, etc.; but is best known as the author of various popular works—e.g. *Plant Form* (1868); *Principles of Ornamental Art* (1875); *Familiar Wild Flowers* (7 vols. 1878-1902); *Symbolism in Art* (1891); *Natural History, Lore and Legend* (1895); and *Butterflies and Moths of the Countryside* (1903).

Hulsean Prize and Lectures were founded by John Hulse (1708-1790), who bequeathed his estates in Cheshire to be applied—first, to maintain two scholars at St. John's College, Cambridge; secondly, to found a prize (the Hulsean prize) for the best dissertation upon some subject connected with the direct or collateral evidences of the Christian religion; thirdly, to found and support the office of a Christian advocate (for which was substituted by statute, August 1860, the Hulsean professor of divinity); fourthly, that of Christian preacher or Hulsean lecturer. At first the duty of the lecturer was to preach annually twenty sermons in St. Mary's great church, Cambridge, on 'the evidence for revealed religion; the truth and excellence of Christianity; prophecies and miracles; direct or collateral proofs of the Christian religion, especially the collateral arguments; and the more difficult texts or obscure parts of the Holy Scriptures.' In 1830 the number of lectures was reduced from twenty to eight, and subsequently to four. The first lecture was delivered by the Rev. Christopher Benson in 1820. Among those who have filled the office of lecturer are Trench, Christopher Wordsworth, Dean Howson, Farrar, and Bishop Boyd Carpenter.

Humane Society, THE ROYAL, was founded in London in 1774 by Dr. Hawes, Dr. Cogan, and others, with the primary object of affording immediate assistance to persons apparently drowned. The society distributes medals and testimonials to those who save, or attempt to save, others from drowning, or who 'show exceptional bravery in rescuing, or attempting to rescue, persons from asphyxia in mines, wells, sewers,' and other places where foul gases endanger life. The society also provides boats and boatmen, and during the skating season ice-men, at the Serpentine, Hyde Park, and other places in London and the neighbourhood.

Humanists, the name applied to the scholars and advocates of the new learning which spread over Europe after the fall of Constantinople in 1453. It was assumed by themselves to emphasize

the difference between them and the supporters of scholasticism. Owing to the fact that the new learning was classical and literary, and the devotion to it at first extreme, the movement tended to be pagan without being declaredly anti-Christian or even anti-papal. None the less, however, it contributed notably to the fostering of that other movement called the reformation. The name survives in the expression 'the humanities,' and in the name of the Latin chair in Edinburgh, which is still called the 'chair of humanity.' Some of the most distinguished humanists were Bembo, Erasmus, Ulrich von Hutten, Sir Thomas More, and George Buchanan.

Humansdorp, div. and tn. in Cape Colony, between Knysna on the w. and Uitenhage on the e. It is well wooded. Its climate is milder and its rainfall more regular than that of the inland karroos and plains. The town is about 50 m. w. of Port Elizabeth. Pop. of div. 11,850; of tn. 600.

Humayun, Mohammed Humayun Nasr-ed-Din (1511-56), son of the famous Baber, and father of the famous Akbar, ascended the throne of Delhi in 1550. After a ten years' struggle with the Afghans and Hindus, he was completely defeated in 1540 by Sher Khan Sur at Kanauij. Though retaining the province of Sindh for more than two years, he had eventually to retreat to Kabul. Then after a long and doubtful contest with his three brothers, he again invaded India, and in 1555, with the help of his general Bairam Khan, defeated Sikandar Shah, and reoccupied Delhi and Agra; but he died at Delhi.

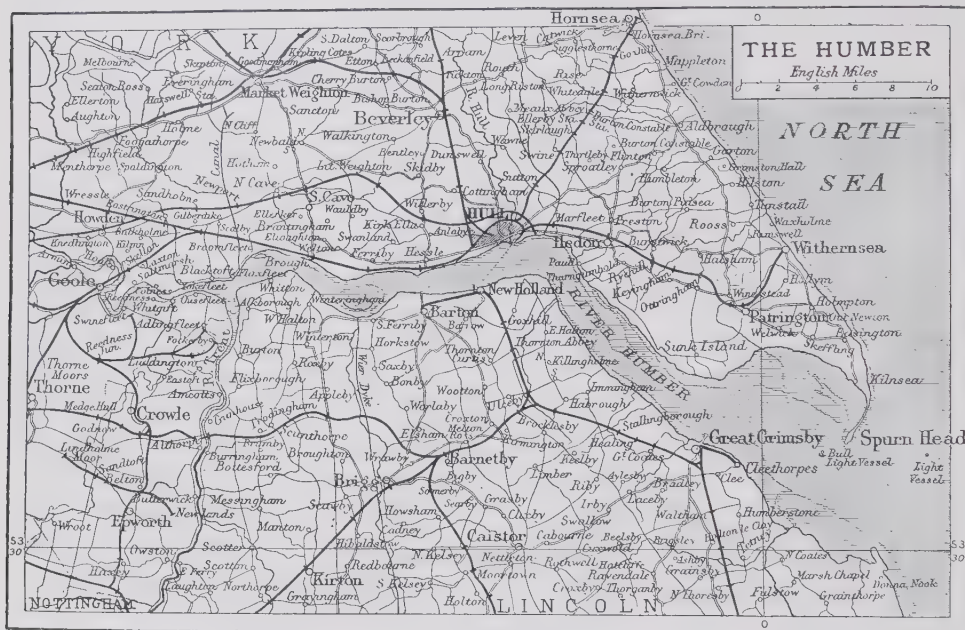
Humber, estuary, E. coast of England, between Yorkshire and Lincolnshire, formed by the Ouse and the Trent, and draining, with its tributaries, an area of about 10,000 sq. m. It stretches E. and S.E. for 38 m., its width opposite Hull being about 2 m. The mouth is enclosed N. and E. by the peninsula terminating in Spurn Head.

Humbert I. (1844-1900), king of Italy, eldest son of Victor Emmanuel II. In the war against Austria he nearly lost his life at Custoza. In 1878 he succeeded his father, and in the same year narrowly escaped assassination at Naples at the hands of a lunatic, Passanante by name. His visit to Vienna in 1881 secured for Italy admission to the triple alliance. King Humbert in later years lost some of his popularity. In 1897 an anarchist attempted his life, but failed. Three years later, however, another attempt was successful. Humbert never failed to co-operate with Britain in questions of international importance.

Humble-bees, or **BUMBLE-BEES** (*Bombus*), are social bees displaying less perfection of social life than their ally the hive-bee. Humble-bees, as is well known, are distinguished by their large, egg-shaped bodies, thickly covered with hair, the slender-elbowed antennæ, and the thick fringe of stiff hair (pollen-basket) on the hind legs of the female. The colours are exceedingly variable, and in con-

sequence emerge as workers, when they take over much of the work of feeding the growing colony, while the queen restricts herself more and more to egg-laying. The distinctions between fertile females and workers are much less marked than in the hive-bee, and both they and the small females produced as the season goes on may lay eggs. As the colony grows larger new brood-cells are constantly added, as well as pollen

humble-bees display in certain respects a considerable amount of intelligence, as well as great industry. Throughout the summer the colony increases in size, until it numbers from one hundred to four hundred. As autumn approaches a large number of males are produced, as well as a number of new queens. The latter, after fertilization has taken place, seek shelter for the winter, while the rest of the col-



sequence there is much difficulty in distinguishing the species. The following account of the habits of the stone humble-bee (*Bombus lapidarius*) applies to the species in general; but there is considerable variation in regard to the position chosen for the nest:—

In spring a fertilized female emerges from the crevice in which she has spent the winter, and, usually under cover of a stone, proceeds to construct a cell of wax lined with honey saturated with pollen. In this several eggs are laid, and the receptacle is closed. After a few days' rest a fresh cell is constructed in a similar way, and even a third. As soon, however, as the eggs in the first cell hatch, the mother's time is much occupied in feeding the larvæ. This she accomplishes by making a small hole in the lid of the cell, and ejecting food from her mouth into it. Ultimately the larvæ pupate, and

tubs and honey tubs, which are necessary to afford reserves of food in case of a spell of unfavourable weather. The cells are very irregularly built, and the whole nest presents an untidy appearance. Nevertheless, the



Humble-bee and Cells.

sequence there is much difficulty in distinguishing the species. The following account of the habits of the stone humble-bee (*Bombus lapidarius*) applies to the species in general; but there is considerable variation in regard to the position chosen for the nest:—

one perishes. In the spring the fertilized female commences the cycle anew.

A very remarkable fact in regard to humble-bees is that their nests are frequently inhabited by commensal or parasitic bees of the genus *Apathus*. These bees are very like their hosts in appearance, each species resembling the *Bombus* with which it usually lives; but their hind legs are devoid of pollen-baskets, and there are no workers. They live on perfectly friendly terms with their hosts, but do no work, save perhaps constructing cells for their own brood, and appropriate a considerable amount of the *Bombus* food supplies. The only harm which they apparently do is that they keep the colony small by consuming much of the food. An account of British humble-bees will be found in F. Smith's *Catalogue of British Hymenoptera*, British Museum catalogues (1876).

Humboldt, riv. of the Great Basin, U.S.A., rises in N.E. of Nevada, and flows nearly S.W. for some 380 m. to the Humboldt Lake. Its drainage basin is 32,138 sq. m., most of which is a desert region.

Humboldt, FRIEDRICH HEINRICH ALEXANDER, BARON VON (1769-1859), Prussian naturalist and traveller, was born at Berlin. He sailed with Bonpland for the Spanish states of S. America in 1799, where they explored the course of the Orinoco, and proved its connection with the Amazons, sailed up the Magdalena, crossed over the Andes, and descended on the other side to the sources of the Amazons; then, after a year spent in Mexico and the United States, the two returned (1804) to Europe. Among other fruits of this journey, Humboldt introduced Peruvian guano into Europe, wrote a treatise on plant distribution, formulated laws as to temperature, discoursed on the earth's magnetic force and on volcanoes, and advocated the igneous origin of rocks. In 1808 he settled at Paris, and then for over twenty years was busy digesting and describing the scientific results of his journey. In 1827 he definitively settled in Berlin, and during the next ten years was occupied with investigations into terrestrial magnetism, though in 1829 he found time for a hurried journey across Siberia. His principal occupation from 1845 down to the time of his death was the composition of the classic *Kosmos*, a summary and exposition of the laws and conditions of the physical universe. Of this there is an English translation in 5 vols. (1849-58). The results of his great journey were published in 30 vols., divided into six separate sections, under the general title, *Voyage aux Régions Equinoxiales du Nouveau Continent, fait en 1799-1804* (abridged English trans., 7 vols., 1814-29). See *Life* by Bruhns (1872; English trans. by Lassell, 1873), and by S. von Günther (1900).

Humboldt, KARL WILHELM, BARON VON (1767-1835), Prussian statesman and writer, elder brother of the above, was born at Potsdam. He was appointed successively minister in Rome (1802), minister of education in Prussia (1808)—it was he who founded the University of Berlin—ambassador at Vienna (1812), and Prussian plenipotentiary at the Congress of Prague (1813). Subsequently he took part in the Congress of Vienna (1814-15), the resettlement of Frankfurt (1816), and the discussions at Aix-la-Chapelle (1818). But in 1819 the reactionary policy of the Prussian government led to his retirement into private life. Thenceforward

he devoted himself to literature. Early in life he had formed a friendship with Schiller, and in 1800 had published a notable criticism of Goethe's *Hermann und Dorothea*. But his attention was now directed mainly to comparative philology and the philosophy of language. In this field he wrote valuable monographs on the Basques and their language (1821), the philosophy of language (1828), and Kawi, the ancient classical tongue of Java (1836-40). His *Gesammelte Werke* were edited by his brother Alexander in 1841-52; a new edition was begun in 1903. His correspondence with Schiller had already appeared in 1830, and that with Goethe was published in 1876, with Christian Körner in 1879, and with his brother Alexander in 1880. See the *Life* by Haym (1856), and B. Gerhardt's *Wilhelm von Humboldt als Staatsmann* (1896-9).

Hume, DAVID (1711-76), Scottish philosopher and historian, born at Edinburgh. In 1734 he went for a time to France, and there wrote the important *Treatise of Human Nature* (1739-40). Hume then turned his pen to subjects of more general interest, and in 1742 published *Essays—Moral, Political, and Literary*. During 1747-9 he was again abroad as secretary to an embassy, after which he settled down to literary work in Edinburgh. Two other philosophical works, which were really popular abridgments of parts of the *Treatise*, were published about this time—the *Inquiry concerning Human Understanding* in 1748, and the *Inquiry concerning the Principles of Morals* in 1751; and another volume of essays, the *Political Discourses*, followed in 1752. With the exception of his *Natural History of Religion* (1755), his literary activity for the next ten years was mainly concentrated on his *History of England*. In 1763 he was again abroad, attached to an embassy to France; and on his return he was, for a short time, under-secretary of state. In 1769 he returned to Edinburgh, where he remained till his death. His *Dialogues concerning Natural Religion* were published in 1779.

The philosophy of Hume was an extreme and thoroughgoing development of the sensationalism that was latent in Locke's account of the origin of knowledge. Applying Locke's method of analysis in all its strictness, he set up as a general test for all ideas that they must be capable of being referred to a definite source or original in impressions. Ideas which cannot conform to this test have no real or objective meaning; they are illusions produced in the mind

by the workings of imagination. Thus, to take a single instance, Hume reduces the conception of causal connection to a mere blind belief engendered by custom, the constant conjunction of two impressions (e.g. flame and heat) suggesting the idea of the so-called effect upon the occasion of the so-called cause. The outcome of such criticism applied to the fundamental concepts on which knowledge rests was naturally a total scepticism. Huxley's *Hume* (1878), in English Men of Letters, gives an account of his sceptical philosophy in its more moderate form, and largely in agreement with it. For the more usual view, see the histories of philosophy, or Seth's *Scottish Philosophy* (1884).

Hume, FERGUS (1862), English novelist, born in England, but of New Zealand parentage, in 1888 produced *The Mystery of a Hansom Cab*, which attained an enormous circulation. Mr. Hume has since written more than forty novels of a similar type.

Hume, JOSEPH (1777-1855), British politician, born at Montrose, Forfarshire, was surgeon in the service of the E. India Company (1797). Upon relinquishing Indian work and returning home (1807), Hume entered (1812) political life as member for Weymouth in the Tory interest. Subsequently he embraced Radicalism, and sat for Aberdeen (1818-30), Middlesex (1830-7), Kilkenny (1837-41), and Montrose (1842-55). He paid great attention to financial questions, especially the public accounts, and warmly supported Catholic emancipation and the removal of other disabilities.

Hume, MARTIN ANDREW SHARP (1847), English historical writer, born in London. He is principally known for his political and diplomatic histories of the Tudor period, and for his numerous works on the history of Spain. He was appointed in 1890 to edit the calendars of Spanish state papers published by the Record Office, and six volumes (four of Elizabeth and two of Henry VIII.) have already been completed (1904). Some others of his principal works are *The Year after the Armada* (1896); *The Courtships of Queen Elizabeth* (new ed. 1904); *The Great Lord Burghley* (1898); *The Love Affairs of Mary Queen of Scots* (1903); *Sir Walter Raleigh* (1897); *Treason and Plot: Struggles for Catholic Supremacy in the Last Years of Elizabeth* (1901); *Philip II. of Spain* (1897); *Spain, its Greatness and Decay, 1479-1788* (1898); *Modern Spain, 1788-1898* (1899); *The Spanish People* (1901); *Spanish Influence on English Literature* (1905); and *The Wives of Henry VIII.* (1905).

Hume, or HOME, SIR PATRICK (1641-1724), first Earl of Marchmont and Baron Polwarth, Covenanting statesman and Lord High Chancellor of Scotland, was born at Polwarth in Berwickshire. In 1665 he was M.P. for Berwickshire, and was imprisoned for his opposition to the government (Lauderdale's policy) in 1675-9. The story of his later concealment in the family vault at Polwarth kirk is well known. (See BAILLIE, GRISELL.) For ten years he lived an exile in Holland, venturing to return with Argyll's ill-fated expedition in 1685, an account of which he wrote (*Marchmont Papers*, vol. iii., 1831). At the revolution he joined William of Orange, and in 1693 he was appointed an extraordinary lord of session, becoming lord high chancellor in 1696. See *Marchmont and the Humes of Polwarth* (1894).

Humeral, a cape or covering for the shoulders. In ecclesiastical ritual, the humeral veil was a silk vestment of an oblong shape, worn over the shoulders during various ceremonies, also covering the hands when the officiating priest held the sacred vessels. The humeral veil was also worn by the Jewish priest on the shoulders, and was fastened to the breastplate. It is referred to in Exod. 28:14.

Humidity, the state of the atmosphere with relation to the vapour that it contains: it is said to be high when the air is damp, and low when the air is dry. Moisture is everywhere present in the atmosphere, but varies greatly both geographically and locally. No other factor taken by itself exercises so predominant and far-reaching an influence on weather conditions as the aqueous vapour in the atmosphere. Temperature and pressure, sunshine and wind, and solar and terrestrial radiation are all subject to marked changes according to the amount of vapour present in the air. The humidity of the atmosphere exercises a strong influence over bodily sensations of heat and cold, and is of importance in breathing, as the quantity of water vapour exhaled with each respiration is much greater when the air is dry than when it is damp. The secretion from the skin is increased when the air is dry; but there is then little perspiration, because it is at once converted into vapour by the dry air, instead of condensing in drops of sweat upon the surface of the body. In a warm, dry air much of the perspiration is unnoticed; while in a hot, humid air it is readily perceived. Cold as well as heat is more easily borne by the human

subject when the air is dry. In order to reduce the moisture present in the air to numerical expression, it is usual to determine the ratio of the quantity of vapour actually present to that which could be held in suspension at the existing temperature. The quantity of vapour present at the time of observation is called the *absolute humidity*, this being expressed either in the expansive force exerted by the vapour, or in its weight in grains per cubic foot of air. The *relative humidity* is ascertained by dividing the amount of vapour that might exist if the air were saturated by the absolute humidity. In this case saturation is represented by 100; but this high value is rarely reached except during a fog or mist. Over the surface of the ocean the relative humidity is usually above 90 per cent., but in dry winter weather over land the value may fall below 50 per cent., while in deserts 20 per cent., or less is far from uncommon. In the British Isles the relative humidity is very generally over 80 per cent., but on rare occasions may fall to 30 per cent., or even lower. On the summit of Ben Nevis a humidity as low as 5 per cent. has been recorded during the occasional intensely dry spells that occur from time to time. Usually, however, the atmosphere on the hilltop is in a state of complete saturation, owing to the presence of mist or fog. The distribution of vapour with height is very unequal, layers of damp and dry air alternating in the most capricious manner. It has been calculated that the first 6,000 ft. of our atmosphere contain one-half of the quantity of vapour present in the air, and that the amount contained above the level of 20,000 ft. is only one-tenth of that at the surface of the earth. From observations taken at seven stations intermediate between the summit and base of Ben Nevis, it has been found that the decrease of vapour with height is constant for each 100 ft. of vertical height up to the level of the hilltop, 4,406 ft. above sea-level. At other stations, however, the diminution of vapour pressure does not proceed at a uniform rate, notably on the Peak of Tenerife, where successive strata of vapour, or, as Herschel has called them, 'vapour plains,' are met with. The instrumental measurement of humidity is discussed at HYGROMETER. See Ravenstein, in *Quart. Jour. Roy. Met. Soc.*, vol. xxvi. p. 296; and Glaisher's *Hygrometrical Tables*.

Hummel, JOHANN NEPOMUK (1778-1837), Hungarian pianoforte composer and player, perhaps Mozart's most talented

pupil, was born in Pressburg; travelled as a pianist in England, Russia, Germany, Holland, and Denmark; became musical director to Prince Esterhazy (1803), also at Stuttgart (1816) and Weimar (1820). His numerous compositions (rondos, sonatas, studies, and church music), though now largely forgotten, were formerly in high repute, for in his prime Hummel was regarded as the equal of Beethoven.

Humming-birds (Trochilidae). The name humming-bird is given on account of the sound made by the wings during flight. So rapid is the motion of the wings that when the birds poise themselves before a flower, as is their habit, nothing can be seen of the wings save a misty outline. The birds fly with great rapidity, and spend practically their whole time in the air, flitting like insects from flower to flower. Their food consists of the insects found in flowers, and not, as was formerly supposed, of nectar, but doubtless a certain amount of nectar is obtained with the insects. There is apparently a relation between the length of the bill and the length of the tubes of the flowers most frequented by the species.

Humming-birds include the smallest known birds, but one form (*Patagona gigas*) reaches a length of eight and a half inches. Among their structural characters may be noticed the compressed head and slender and pointed bill (points of contrast with their reputed nearest allies, the swifts), the ten primaries of the wing, the short metatarsus and usually small and delicate toes, the remarkable tubular tongue (which is protrusible and has bony supports something like those found in the woodpecker), the presence of a crop, and the great development of the sternum, which affords a large surface for muscular attachment, and is thus associated with the power of swift flight. The colours are of the type known as optical or structural, and are especially brilliant in modified tufts of feathers which occur as crests, gorgets, ear-tufts, beards, and so on. These glowing tufts are usually absent in the females. The beauty is accentuated by the structure of the tail, which is often greatly elongated, forked, or bears racket-shaped plumes. Typically, these birds are inhabitants of central and tropical S. America, but their range extends from Alaska in the north to Tierra del Fuego in the south.

The nest is very small, sometimes no bigger than a walnut shell, and is cup-shaped. Externally it is covered with lichens or leaves so as to be quite inconspicuous. One or two eggs are laid at a time, and the blind and

naked young may be no larger than humble-bees. The parents in some cases add to the nest as the young grow. The species of *Oreotrochilus* construct a large mass of wool, hair, feathers, etc., which is hung from some support, and bears a small depression above, in which the eggs are laid. It is stated to be weighted at one side with stones or earth, if it shows any tendency to loss of equilibrium. The cock is very bold, and will not hesitate to attack even large birds if they approach the nest.

As examples of humming-birds may be mentioned *Eugenes fulgens*, which has a green throat and brilliant violet crown. The tiny *Mellisuga minima*, which is only about two inches and a half long, inhabits Jamaica and San Domingo. One of the most beautiful forms is *Loddigesia mirabilis*, from N. Peru, which has a cobalt-blue crest, an emerald-green throat, and the two outermost tail feathers racket-shaped, with their discs steel blue. In the species of *Sappho* crimson tints predominate, as they do in the ruby-and-topaz *Chrysolampis mosquitos*. To the genus *Phaethornis* belong the soberly-clad 'hermits,' with their colouring of green and gray. In Africa and India the name humming-bird is often incorrectly given to the sun-birds, or Nectariniidae. See Gould's *Monograph of the Trochilidae* (1849-57), magnificently illustrated.

Humperdinck, ENGELBERT (1854), German musical composer, born at Siegburg on Rhine, was a teacher at the conservatorium at Barcelona (1885-6), then at Frankfort-on-Main (1890-6), and since 1900 has been professor at Berlin. He ranks with the young Wagnerians, and has been closely associated with the family of the Marta, whose son Siegfried he taught. Humperdinck's early works—the cantatas *Das Glück von Edenhall* and *Die Wallfahrt nach Kevelaar*—were but little heeded; but the fairy opera, *Hänsel und Gretel*, produced (with his sister as librettist) at Weimar (1893), brought him European fame. Later works of similar character are *Sieben Geiseln* and *Die Königsinder* (1896).

Humphry, SIR GEORGE MURRAY (1820-96), English surgeon, was born at Sudbury, Suffolk; in 1866 he succeeded Dr. Clark as professor of anatomy in Cambridge, and in 1883 resigned this for the professorship of surgery. It was mainly through his energy that Cambridge attained its high reputation as a medical school.

Hu-nan, prov., Central China, between 23°-30° N. and 109°-114° E. It is broken up into valleys

divided by low-lying hills, and is bounded E., S., W. by mountains rising from 3,000 ft. to 6,000 ft. These drain into the Tung-ting Lake, which in summer has an area of over 2,000 sq. m., and has its outlet into the Yang-tse-kiang. The Hsiang and Yuan rivers are the chief commercial routes to the provinces of Kwang-tung and Kuei-chau. A very extensive coal field (anthracite and bituminous) lies to the E. of the Hsiang. Coal, iron, copper, antimony, lead, and silver are found. Tea, rice, cotton (in the N.), and timber are the chief natural products. Oils, pottery, paper, and furniture are among its other exports. The population is hardy, independent in character, and until recently very anti-foreign. The aboriginal tribes, which exist in the S.W., are not under Chinese control. Chang-sha, the capital, has a population of over 300,000. Area of province, about 70,000 sq. m. Pop. (1902) 21,000,000.

Hun-barrow, a term used in the south of Wiltshire to denote an artificial mound or barrow.

Hunchback, or **HUMPEACK**, arises in consequence of abnormal curvature of the dorsal portion of the spinal column. The slighter degrees of the deformity may result from lateral curvature, which again is caused by such conditions as obliquity of the pelvis from the shortening of one leg, contraction of one side of the thorax following empyema, unilateral muscular action from paralysis of opposing muscles, or the habitual one-sided position of the body assumed by many weakly children who are growing rapidly. Rickets and struma are also important factors in the causation of the condition. In such cases there is a rotation of the spine on its axis, so that the ribs of the side towards which the convexity of the curvature points are protruded, being wheeled backwards and upwards, with the result that the corresponding shoulder is raised. Most usually the right is the side affected, and the condition is thus an exaggeration of the slight curvature which normally results from the greater use of the right arm. A graver condition is the deformity arising from Pott's disease, or, as it is called, 'angular' curvature, which is due to inflammation and necrotic destruction or caries of the anterior parts of the vertebral bodies and intervertebral discs. After the necrosed parts have been cast off by abscess formation and the inflammation has subsided, the adjacent vertebrae above and below the seat of disease become fused together by cicatricial tissue, so that the upper part of the spine is bent

forward at an angle proportionate to the amount of bone destroyed. Another cause of hunchback is chronic rheumatic arthritis. In this condition, which affects the old, the head is sunk between the shoulders, and the spine is so much bent forward that the patient requires a stick to maintain balance. The deformity, however, is less of a hump than a general curvature.

Treatment.—In slighter cases much may be done by rest in the supine position, alternating with drill and muscular exercises adapted to the patient's condition. Apparatus may also be worn fitted with elastic belts so arranged as to counteract rotatory or other abnormal tendency. In severer cases it may be necessary to apply a plaster-of-Paris jacket or a rigid framework, in order to secure relief from the superincumbent weight of the head and trunk above the curvature. Jury-masts or similar supports are applied in special cases. It may be said that the treatment of spinal disease resolves itself into physiological rest; but measures must also be taken to maintain the general health at the highest possible level, and to counteract tubercular or rachitic tendencies by fresh air, nourishing diet, and drugs such as cod-liver oil and iron.

Hundred, a subdivision of a county, differing greatly in extent in different parts of England. The inhabitants of the hundred were, till the Riots (Damages) Act, 1886, liable for damages done by rioters. In some cases courts are attached to hundreds.

Hungarian Wines are of a varied type. Some belong to the reds, and slightly resemble the clarets. Of these, the best known are Karlowitz and Erlau. The white wines, on the other hand, are somewhat like Hermitage from the Rhone district. The more important are the different brands of Tokay, both dry and sweet. The alcoholic strength is from 9 to 11 per cent.

Hungary, KINGDOM OF (Hung. *Magyarország*), an independent member of the Austrian-Hungarian empire, lies E. of Austria, with Austrian Galicia on the N., Roumania on the E. and S., and Servia, Bosnia, and Dalmatia also on the S. It embraces Hungary proper (area, 108,229 sq. m.), Croatia-Slavonia (16,418 sq. m.), and the city of Fiume (8 sq. m.), and has a total area of 124,655 sq. m. Since 1867-8 the former principality of Transylvania has been completely incorporated with Hungary. On the N., E., and S.E. the kingdom is encircled for 900 m. by the Carpathians; and various spurs of the same system—e.g. the Little Carpathians,

Tatra, Matra, Bükk, Bihar, and other mountains—occupy large areas in the N. and W. In the W. and S.W. the extreme outlying ramifications of the Alps stretch a long way into the country—e.g. the Bakony Wald (2,000 ft.), and the N. sections of the Karst, as the Kapella Mts. (4,500 ft.) and the Velebit Planina (5,600 ft.). But the characteristic feature of Hungary is the great central plain, some 37,500 sq. m. in extent, of the Alföld. Whether it is a desiccated lake basin or a result of the denudation of the Miocene deposits which probably once covered it, is not determined. Some parts, especially between the Danube and the Tisza, are

or Waag, Gran, Körös, Maros, and Temes on the left, and by the Leitha, Raab, Drave, and Save on the right. Several of these rivers, especially in the Alföld, are liable to sudden floods. The Hungarians try to guard against this danger, partly by straightening and embanking the rivers (e.g. the Tisza), and partly by constructing canals, as the Franzen, Bega, Sarviz, Albrecht, Sio, Kapos, and others. Besides Lake Balaton (265 sq. m.), Hungary contains the Lake of Neusiedl (100 sq. m.) and the lofty mountain tarns of the Carpathians and Tatra Mts., known as *Meeraugen* (lake-eyes).

Owing to the protection of the

mining. Of the total area, 45 per cent. is under the plough in Hungary, and 34 per cent. in Croatia-Slavonia. But pastures and meadow-lands cover in Hungary 23 per cent. of the area, and in Croatia-Slavonia 24½ per cent. The land is about equally divided between peasant owners cultivating small estates, and nobles, parishes, the state, and public bodies which own and cultivate large estates. The forests cover no less than 26½ per cent. of the total area in Hungary proper, and 35½ per cent. in Croatia-Slavonia. The gold mines of Transylvania have been worked since Roman times, and still yield nearly £500,000 annually. Iron and



little better than sandy deserts, while other parts (e.g. near Lake Balaton or Plattensee in the W.) are marshy. The greater part of the Alföld consists of wide, open, treeless steppes called *puszta*s, where graze vast herds of horses, cattle, buffaloes, sheep, and swine; but many acres have recently been converted to the plough, the soil being excellently adapted for the growing of wheat. In the W., between the Little Carpathians and the Bakony Wald, there stretches a smaller plain, some 4,500 sq. m. in area, and very fertile.

The Danube crosses Hungary from west to south-east (580 m.), and is joined by the Tisza or Theiss (810 m.), the March, Vag

Carpathian girdle on the N. and E., and its open situation towards the S., Hungary enjoys a relatively mild climate, though a few of the northern mountainous counties have a long and severe winter. Hungary produces large quantities of wine, tobacco, and fruit (walnuts, plums, watermelons, chestnuts, mulberries). The summers are generally hot, and the mirage is a common feature of the open sun-baked *puszta*s. But there is often a great daily range of temperature, as much as 46° F. between sunrise and noon in summer on the *puszta*s. The rainfall is everywhere low, only just over 20 inches annually.

The two chief industries are agriculture (chiefly cereals) and

silver are mostly mined in the N. and in Transylvania. Coal, mostly brown coal and lignite, is mined to the extent of nearly seven million tons annually. Salt is extracted to the annual value of over £1,000,000. Opals are found in the extreme N. Manufacturing industry has quite recently received much encouragement from the state; but scarce any branch exports its products, except the flour mills and sawmills. The other chief branches are breweries and distilleries, factories for sugar, tobacco, textile, leather, glass and pottery, vehicles, paper, and chemicals, and the making of wine. The rearing of silkworms, fishing in the rivers (for carp, sturgeon, barbel,

salmon, trout, etc.), the making of baskets, gathering of honey, rearing of poultry, and refining of petroleum, are also sources of income. The exports are principally agricultural products—flour, cereals, live stock, eggs, and wine. The total exports amount to £56,000,000 annually, and the total imports to £18,250,000. The principal, indeed the only, port for foreign sea-borne trade is Fiume (ten and a half millions sterling). More than three-quarters of this trade is carried on with Austria. Next in order come Germany, Roumania, Servia, and the United Kingdom. It was on the Hungarian railways that the zone system of passengers' fares was first introduced in 1889.

The dominant race are the Magyars or Hungarians (51 per cent. in Hungary proper). The Roumanians form a pretty compact mass in the E. and N.E., and in Transylvania, amounting to 16½ of the total population. Germans (11·9 per cent.) and Slovaks (11·9 per cent.) predominate in the N. and N.W. There is a strong Ruthenian element (25 per cent.) in the N.E. Croats and Servians make up only 3·8 per cent.; but in Croatia-Slavonia almost the entire population of 2,416,304 (1901) are of Croato-Servian blood. Pop. of Hungary proper, 16,838,255; of the entire kingdom of Hungary (1901), 19,254,559. Included in this number are some 80,000 gypsies. There is a steady stream of emigration, chiefly of Slovaks, to the United States, and of Roumanians to Roumania and the Balkan states. By religion 48·7 per cent. of the population of Hungary proper are Roman Catholics, 11 per cent. Greek Catholics, 13 per cent. Greek Orientals, 21·9 per cent. Protestants, 5 per cent. are Jews, and only 0·4 per cent. Unitarians. Similar proportions hold good of Croatia-Slavonia. Education is making appreciable strides. There are three universities—at Budapest (attended by 6,586 students in 1903-4), Kolozsvár or Klausenburg (1,925 students), and Zagreb or Agram (908 ordinary and 113 extraordinary students). The illiterates numbered 48½ per cent. in Hungary proper in 1901, and in Croatia-Slavonia 33½ per cent.

The constitution of Hungary as a kingdom dates from the year 1000, and the first charter from the Golden Bull of 1222. The constitution was in abeyance from 1849 to 1860, but has existed in full validity since 1867. For the relations with Austria, see AUSTRIA-HUNGARY. The Hungarian Parliament consists of the House of Magnates, and the House of Representatives, embracing 453 members (of whom forty for

Croatia-Slavonia), who are elected for five years. The executive is vested in a president and nine ministers. Croatia-Slavonia forms an autonomous part of the kingdom, sending delegates to both houses of the Hungarian Parliament, but ruling itself by a provincial diet of ninety elected members. See A. von Matkovits's *Das Königreich Ungarn* (2 vols. 1900); Jekelfalussy's *Der tausendjährige Ungarische Staat* (1896); L. Felbermann's *Hungary and its People* (1892).

History.—Within the Carpathians, between the Danube and the Theiss, were some fifteen nationalities when the Magyars, some 100,000 strong, appeared (896) under Almus. Attila and his Huns had held the fertile plain in the 5th century A.D., the Gepidæ in the 5th and 6th centuries, the Avars in the 7th and 8th, the Slavs in the 8th and 9th. The remnants of these races the Magyars swept away to the mountainous verge of the plain, establishing themselves on the Theiss. Here, for a thousand years, they have held their own, and were never more a nation than to-day, for 'Hungary has not yet been, but is still to be.' From 996 to 1301 they were ruled by dukes (4) and kings (21) of the stock of Árpád, son of Almus. Christianity and monarchy arrived together in the person of Stephen, saint and king (1000-1038), from whom Hungary received a constitution combining Roman centralization with German autonomy, each county being governed from a local centre, whilst the country was legislated for in the National Assembly or Diet. In 1222 the Golden Bull, or Magna Charta of Hungary, was signed by Andrew II. (1205-35), as since by each successive sovereign, including the Hapsburgs. This parallel to English history may be further traced in barons' wars, in the struggle of the lower nobility (commons) for parliamentary privileges, in peasant risings, and in dynastic struggles. Hungary, like England and Poland, maintained her central Parliament and limited monarchy, but failed in her struggle with absolutism, the Hapsburgs succeeding where the Stuarts failed. From the Árpád dynasty to the Hapsburgs eleven kings ruled, Louis I. of Anjou (1342-82) being the most formidable continental European monarch of his time. Then followed the struggle with the Ottoman invasion, in which John Hunyadi, regent (1446-52) under Ladislaus, defeated the Sultan before Sofia (1443), made a peace for ten years (1444), and successfully defended Belgrade (1456). His son Mathias, elected

king in his boyhood, founded the Black Legion, the Hussars, the University of Buda; conquered Vienna (1485) and held it till his death (1490). But in 1526 Hungary received a crushing blow from the Turks in the battle of Mohács. (For the Ottoman conquest, see Professor Bury's article in the *Cambridge Modern History*, vol. i.). From this period commences the rule of the house of Hapsburg, fifteen kings in all, from Ferdinand I. (1527-64) to Francis Joseph (1848). Hungary was now (1538) partitioned, Austria being supreme in the west, Turkey in the south and centre, whilst Transylvania remained the rallying-point of Magyar life and nationality. For some hundred and fifty years the Turks were masters in two-thirds of the Hungarian counties, from which they were driven (1683) by John Sobieski, king of Poland, and Leopold of Austria. But Hungary had only changed masters, and was never lower than after the peace of Carlowitz (1699). In Transylvania, however, Prince Francis Rákóczy raised the last great rebellion previous to 1848, when Hungary reasserted her independence and nationality. The reformation aroused bitter sectarian feeling in Hungary, where Protestant and Catholic are still at daggers drawn, and the butcheries of Eperies (1687) are notorious. Charles VI. (1711-40) recognized Hungarian independence under the Pragmatic Sanction, and the Magyars in return championed the cause of his orphaned daughter, Maria Theresa (1740-80)—'Moriatur pro rege nostro!'—and she, in gratitude, alleviated the condition of the serfs, founded schools, universities, and the famous Hungarian guard of nobles. Till 1788 the history of Hungary is merged in that of Austria, but the Germanizing reforms of Joseph II. produced an outburst of national spirit, and this led to their withdrawal (1790).

From 1792-1815 Hungary supplied men and generals to the Austrian army, and took her share in combating the French republic and empire. The oppressive policy of Metternich drove Hungary into political revolt, which culminated in an armed rebellion (1848). Under Louis Kossuth the Austrians were driven out of Hungary, but owing to the intervention of Russia the Magyars surrendered at Világos (1849), and a military dictatorship was established by Austria. In 1860, however, a reaction began, and after the defeat of Austria by Prussia at Königgrätz (1866), Francis Déak, the Hungarian patriot, and the Austrian Count Beust restored Magyar autonomy and independence. Since 1867

Hungary has stood for complete home rule, and whilst confederating for imperial purposes, acknowledges only the link of the crown, an Austrian needing to be naturalized in Hungary, and *vice versa*. To the expenses of the 'imperial and royal' (1899) army, navy, and diplomatic services Hungary contributes her 'quota,' settled by agreement between the two parliaments every ten years. The method of discussion is cumbersome, wearisome, and once (1876-8) took two years to arrange. Hungary is said to have 70 per cent. of the power and 30 per cent. of the taxation. From 1870-1902 internal politics in Hungary largely consisted of a struggle between Catholics and Protestants—Tisza (1875-90), Wekerle (1892), Bánffy (1895) representing the latter, and Szapáry (1890-2) and Szeil (1899-1902) the former. Civil marriage, Jewish toleration, religious independence, have been amongst the burning questions. The Magyar millennium (1896) was celebrated by a great exhibition at Budapest. Since Széchenyi—the greatest Magyar—spoke in the Diet in his native tongue instead of in Latin (1832), national institutions and spirit have flourished: parliament, literature, the press, the stage, the school, have been revived and nationalized. The wave of liberal and patriotic feeling of 1848, violently checked, re-formed in 1867, has been bearing the Magyars with it to the high-water mark of independence. And it is interesting to note that Francis Kossuth, son of Louis, to-day maintains under the same sovereign, Francis Joseph, the cause his father championed in 1848. See *Hungary and its Revolutions* (1889), Vambéry's *Hungary* (1890), Sayon's *Histoire des Hongrois* (1875), Jekelfalussy's *L'Etat hongrois Millénaire* (1896), Leger's *Histoire de l'Autriche-Hongrie to 1894* (1895), articles by E. D. Butler in *Encyc. Brit.*

Language and Literature.—According to Professor Simonyi of Budapest—the greatest living authority—the Hungarian language, together with Vogul Ostiak, Siryenian, Votiak, Lapp, Finnish, Mordvin, Cseremiss (N. and N.E. Russia), forms the Ugrian group of tongues akin to Samojed, Turkish or Tartar, Mongolian, Tungusian or Manchurian, the five being termed Altaic, derived from an archaic Altaic or Central Asian idiom. Of the Ugrian group Hungarian (Magyar) most resembles Finnish, Lapp, and Turkish. Affinity to Hebrew was suggested by Martin Bél, and to Chinese by Podhorszky. Magyar has remained pure, some accretions from Slav

and German excepted. It is an agglutinative tongue, the root nearly always forming the first syllable of the word, to which affixes are added, prepositions becoming postpositions. Thus the root is obvious, not concealed, as frequently in Aryan tongues. New words and compounds being easily formed, shades of meaning are readily expressed, and Magyar is an excellent vehicle for psychology and metaphysics, adapts itself to classical metres, especially Alcaics, but is not so good for rhyme. Unwritten till the introduction of Western Christianity, its alphabet consists of Latin characters (forty). There are fifteen vowels (no diphthongs) and eight double consonants. Each symbol has always the same vocal value, and each vowel forms a separate syllable—e.g. *fi-a-im*. The accent falls on the first syllable, and the emphasis on the first word of a phrase. There are many diminutives. A peculiarity is the absence of the auxiliary 'have,' which is supplied by *van* = to be, with the possessive: *Péternek van háza* = there is a house of Peter = Peter has a house. Usually studied through German, Magyar may be seen succinctly explained in the *Short Hungarian Grammar* of Ignatius Singer (1882). Bizonfy's *English-Hungarian Dict.* (the first) appeared in 1886. See *The Hungarian Language*, by Sigismund Simonyi (1889); *Lexicon Linguae Hungaricae Aevi Antiquioris* (11th century to 1780), by Gabriel Szarvas and Sigismund Simonyi (1891), to be completed by a dictionary of the literary language since Kazinczy (before 1780), and by a dictionary of local dialects.

Hungarian literature dates chiefly from 1780, yet there are more than 5,000 Magyar authors. From 1531-1711 there appeared 1,793 works in Magyar and in other tongues 2,847. Latin was more in use than the national idiom in the 13th and the first quarter of the 19th century, and French, German, English, and Italian were widely read and studied. Hungarians, too, such as J. L. Klein and Charles Beck, wrote and ranked as foreigners. Consant wars and the absence of a middle class also helped to retard the growth of a literature which is nevertheless rich in variety, strong especially in poetry and the drama, and graced by one, at least, of the great novelists of the world. Like the nation itself, its literature 'has still to be.' The country whose senate debated in Latin, whose magnates up till 1870 often used Latin, Magyar, Slovak, and German in the same sentence when conversing, excelled in linguistic skill and in

knowledge of other literatures, and was apt to neglect its own. But since 1832 the literature of Hungary has reflected the growth of national life and feeling. The years 896-1772 may be termed the period of growth, afterwards of an ever-increasing development. Till 1450 there is little to record, the oldest relic being a funeral sermon (*Halotti Beszéd*) of the early 13th century. To this early period belong the bards, *írgigecek* or *hegedósók* (violinists), who sang of Attila, the Arpads, the conquest of Transylvania. (See *Anonymous Chronicle*.) From the 14th century the *Tsiganes*, or gypsies, monopolized Magyar music, in which, as for instance in the *Csárdas* and in the famous *Rákóczy March*, attributed to a gypsy woman, Panna Czinka, the soul of the nation may be found no less than in its literature. (See *Hungarian Music*, by Kaldy.) Christianity brought with it lives of saints—e.g. St. Mary and St. Margit; and from 1520-1711 the reformation, the renaissance, and the national spirit evoked by Matthew Hunyadi tinged the productions of the time. Foreign scholars (Anton Bonfini, Marzio Galeotti), a new university (that of Pozsony, with the Corvina library), a printing-press at Buda (1473), and a translation of the Bible by Caspar Károlyi, all aided in the production of an ever-increasing literature. The first Hungarian drama, *The Marriage of Priests* (*à papok házassága*), by Michael Sztárai (1550); the still popular *Argtrius Királyfi*, by Albert Gergei; *Flower Songs* (*Virág-énekek*), by Balassi (1551-94)—discovered only in 1874—author of the Balassi stanza, are notable. Turkish and Austrian tyranny exercised a depressing influence throughout the 17th century, as did the dead hand of Latin and the schoolmen in education, and the best work was done by the magnates who could read French and Italian. The cardinal primate Peter Pázmány (1570-1637) and the Protestant Albert Molnar de Szenicz (1574-1634) were rivals in prose, whilst in verse Count Michael Trinyi (1618-64) celebrated in an epic of fifteen cantos (*Trinyiad*) his father's exploits against the Turks. *The Venus of Murany* (1664), written in Alexandrines by Stephen Gyöngyössi, the *Kurucz* (political) ballads, an encyclopædia (1655), a dictionary (1708), and chronicles by John Szalárdi, should be added as of importance. From 1711-72 there is little to record save heavy learned works, and French and German translations. Greek was neglected; Latin was the language of parliament, though the

Jesuits, who taught it in thirty gymnasia, were proscribed (1773). From 1772 began a period of revival, the French revolution making itself felt in the realm of literature as in that of politics. Periodicals were founded—*Magyar Múza* (1787), *Múzeum* (1788)—and various 'schools' (e.g. Hungarian Guard, classical school, Magyar school) produced their authors. Francis Kazinezy (1759-1831), Alexander Kisfaludy (1772-84), and Daniel Berzsenyi (1776-1826) were famous poets of the time. Inspired by Count Stephen Széchenyi and the liberal and patriotic party, Hungarian literature entered its latest and triumphant phase. In 1830 the Academy, in 1837 the national theatre at Pest, were founded. Periodicals, 5 in 1820, 10 in 1830, 26 in 1840, rose to 645 in 1891. In 1844 Hungarian became the language of the schools. Széchenyi drove Latin from the Diet by a daring speech in Magyar, and the imperial lips spoke Magyar from the throne. A mere indication of authors follows. Poets: Charles Kisfaludy (1788-1830); Michael Vörösmarty (1800-53)—the National Hymn, *Szózat* (1837); Gregory Czuczor (1800-66); Alexander Petöfi (1823)—*Rise, O Magyar, Talpra Magyar* (1848); John Arany (1817-82)—*Toldi Trilogy, Capture of Murany*; Michael Tompa (1817-68)—*Flower Fables, Virágregék*. Novelists: Nicolas Josika (1794)—*Abafi, The Bohemians in Hungary*; Joseph Eötvös (1813)—*The Carthusians, The Village Notary* (1845); Sigismund Kemény (1875)—*Gyulai Pál, Rough Times* (1862); Maurus Jokai (1825), who has written more than 250 novels—among them, *A Hungarian Nabob* (1856), *Love's Fools, The Golden Era of Transylvania*. Since 1848 a great dramatic revival has produced Katona (1830), *Banús Bánk*; Edward Szigligeti (1814-78), folk-dramas; Charles Hugo Bernstein (1817-77), *Banker and Baron*; Gregory Csiky (1842-90). Critic: Joseph Bajza (1804-58). See *Hungarian Literature*, by Emil Reich (1898); *La Hongrie littéraire et scientifique*, by J. Kont (1896); *Hungarian Lit. Hist.*, by Francis Toldy (1805-75), also by Isolt Beöthy (1892, 6th ed.) and 1896 millenary; in German by Schwicker (1889), in Italian by Zigány (1892); *Lit. Biog.* by Joseph Szinnyei, *Jun.* (1891); *Poetic Selections*, by Paul Erdelyi (1895); *Catalogue of Hungarian Books*, by Charles Szabó and Arpad Hellebrandt (1879-96) down to 1711; also by Géza Petrik (1712-1860) appeared 1888-92; *Index to Periodical Literature*, by József Szinnyei (1874-85). General: *Pallas Encyclopaedia* (16 vols., 1898).

(5)

Hunger is a recurring painful sensation due to the organic need for food. That hunger is a local feeling due to a general condition is shown by the fact that food introduced into the bowel ultimately relieves the local craving of the stomach. Normally, however, hunger immediately disappears when sufficient and suitable food enters the stomach. Hunger is not essentially or strictly periodic, but the times of recurrence may be made regular by training. These in general follow the rate of digestion. The physiological structures that subserve the sensation of hunger have not been determined. Probably the mechanical effects of the food is an element, since the immediate sensation may be allayed by entirely indigestible substances ingested. In birds this is markedly so. From this it may be inferred that the local sensation is only a specialized form of a widely-diffused craving, and that the nervous basis of hunger is not confined to the stomacheic nerves. The tone of the vascular system is also a factor; but how far it accounts for the caprice of appetite is undetermined. Hunger is at first a vague uneasiness. If unsatisfied, it becomes a gnawing pain, chiefly at the pit of the stomach; if still unsatisfied, it ceases to be local, and becomes an irresistible organic craving, accompanied by great excitement; if still unsatisfied, it passes into the delirium of acute starvation. Hunger applies equally to the periodic or recurrent necessity for food as manifested in all organized forms of life. From the evolution standpoint, hunger is a phase in the rhythm of nutrition, a sequel to assimilation; it is the organic index of incipient death, and therefore becomes the fundamental motive to individual self-preservation.

Hungerford, tn. and par., Berkshire and Wiltshire, England, on the Kennet, 24 m. s.w. of Reading. Fishing is extensively engaged in, trout being plentiful. Area, 5,437 ac. Pop. (1901) 8,472.

Hungerford, MARGARET WOLFE (?1855-97), Irish novelist, was born in Ireland. Mrs. Hungerford's principal novels are *Phyllis* (1877), *Molly Bawn* (1878), *Mrs. Geoffrey* (1881), *April's Lady* (1891), and *A Conquering Heroine* (1892).

Hung-yen, cap. of prov. Hung-yen, Tong-king, French Indo-China, 31 m. s.e. of Hanoi, on Red R. It manufactures feather fans. Its citadel was demolished in 1890. Pop. (1894) 8,055.

Hünningen, tn., Alsace-Lorraine, Germany, on l. bk. of Rhine, 2½ m. N. of Basel. It has a famous fish-breeding establishment. Pop. (1900) 2,936.

Hünnen-Betten, or HUNNEBEDS, the name given to a series of megalithic cairns, akin to dolmens, situated in the Netherlands, almost exclusively in the province of Drenthe. They resemble the 'giants' graves' of other parts of N. Europe. According to Franks, they belong to a period far anterior to the Christian era; while, on the other hand, Fergusson regards them as post-Christian. See Fergusson's *Rude Stone Monuments* (1872), and Munro's 'Megalithic Monuments of Holland,' in *Proc. Soc. Antiq. Scot.*, vol. xviii.

Huns, a people of Tartar or Ugrian stock, who in the 3rd century B.C. seem to have dominated the whole of N. Asia, from the Ural Mts. to the Straits of Korea; and the famous Great Wall of China was erected at this time to check their inroads. The Huns, however, unsurpassed as horsemen and archers, moving from place to place with marvellous swiftness, capable of enduring any hardships, and brave to the extreme of ferocity, speedily overcame their civilized foes—e.g. the Chinese, over whom they exercised for some time a savage suzerainty. This galling tyranny was, however, shaken off by the Chinese in the following century, and the Huns themselves were reduced to vassalage, or compelled to wander westward in search of new conquests.

When the Huns first appeared in Europe remains a matter of conjecture: but crossing the Volga, they overthrew the kingdom of the Alans about 374, and pressed on at once to the conquest of the Gothic empire. Classic writers refer to 'the shrill voice, the uncouth gestures, and the strange deformity of the Huns.' They were distinguished from the rest of the human species by their broad shoulders, flat noses, and small black eyes, deeply buried in the head; and they were almost destitute of beards. Later writers point to the great size of their canine teeth; and more than once they are accused of cannibalism. The Huns are described as using bows and arrows, sabres, javelins tipped with bone, and slings or lassoes. At the same time, 'the trappings of their horses, their swords, and even their shoes, were studded with gold and precious stones; and their tables were profusely spread with plates and goblets, and vases of gold and silver, which had been fashioned by the labour of Grecian artists.' Certain magical attributes were ascribed to the Huns as a race. Like the modern Lapps, they were believed to have the power of raising storms of wind and rain at pleasure; and Attila was

dreaded not only as a powerful monarch, but as a great magician.

Supreme between the Danube and the Volga, the Huns successfully invaded Persia, terrorized Syria, and threatened Italy; and in 446 Attila was in a position to dictate to the Byzantines a treaty by which they surrendered a part of their territory, paid an immediate indemnity of six thousand pounds weight of gold, and agreed to pay two thousand one hundred annually to their suzerain Attila. Four years later he simultaneously declared war against the empires of the East and the West. At Châlons-sur-Marne, east of Paris, was fought, in 451, the great battle which at length broke his mighty power. In this momentous engagement Attila's immense army, estimated at half a million of men, was defeated by the combined armies of the Romans and the Visigoths, under Ælius and Theodoric. In the following spring, however, Attila launched himself upon N. Italy, whose cities he devastated and plundered. But all further schemes of conquest were effectually put a stop to by his sudden death in 453.

For several centuries the Huns continued to figure in European history, their home being chiefly in the Danube region, whence they issued to battle with Charlemagne, and, in the 9th and 10th centuries, to ravage Italy and Germany.

Although Hungary may owe its name to the early Huns, the present Hungarians, the Magyars, are descended from immigrants of the 9th century, who came as successful invaders from the East. Whether the Huns who ravaged Italy in the 9th and 10th centuries were mainly of the old Hun race, or were their Magyar conquerors, is something of a problem.

See Gibbon's *Decline and Fall of the Roman Empire*; De Guignes's *Histoire Générale des Huns* (1756). See, further, ATTILA.

Hunsrück, plateau of Germany, between the Rhine, Moselle, and Saar, averaging nearly 2,000 ft. in altitude. It is well wooded, yields coal and iron, and produces good wine and fruit.

Hunstanton and New Hunstanton, seaside resorts and pars. formed (1898) out of the old parish, 17 m. N.E. of Lynn, Norfolk, England. Pop. (1901) 1,893.

Hunt, ALFRED WILLIAM (1830-96), English landscape painter, born in Liverpool. Ruskin's critical admiration of his *Llyn Idwal* in the Academy of 1856 determined his vocation. He painted mainly in water colour, with fine observation of nature and delicately finished detail. A follower of Turner, he strove 'to paint light which should carry

true colour, and colour which should interpenetrate, without confusing, the true relations of light and dark.' Amongst his works may be named *Wastdale Head, from Styhead Pass* (1854); *Windsor Castle* (1889), in the Tate Gallery, London; *Working Late* (1873), in Walker Art Gallery, Liverpool.

Hunt, HENRY (1773-1835), English Radical reformer, known as 'Orator Hunt,' was born at Up-haven, Wiltshire. Joining the yeomanry, he was fined and imprisoned for challenging his commanding officer to a duel (1800). Later he became a Radical, and contested Bristol (1812), Westminster (1818), and Somerset (1826). He was present at the meeting at Spa Fields (1816), and for a speech at the Manchester meeting (1819) he was imprisoned for two years. He was M.P. for Preston (1830-3). See *Memoirs* (1820), and *Life* by Huish (1836).

Hunt, HENRY JACKSON (1819-89), United States soldier, was born at Detroit, and distinguished himself in the Mexican war, especially at Contreras and Churubusco, and in the assault on Molino del Rey (1847). He was engaged at Bull Run, and as chief of artillery of the Army of the Potomac took part in numerous subsequent battles of the American civil war, finally assisting in the pursuit and capture of Lee's army.

Hunt, JAMES HENRY LEIGH (1784-1859), English essayist and poet, was born at Southgate, Middlesex. In 1801 his father published a selection from his verses, *Juvenilia*, which ran through three editions in a very short time. In 1808, with his brother, he founded the *Examiner*, he himself assuming the editorship. In 1812 an article on the prince regent led to the brothers being each fined £500, with two years' imprisonment. In jail Leigh Hunt still continued to edit the *Examiner*. He also published his second volume of verse, *A Feast of the Poets* (1814); wrote *The Descent of Liberty: a Mask* (1815); and began his most important poem, *The Story of Rimini* (1816). Soon after his liberation (February 1815) Hunt removed to Hampstead, where Byron was a frequent visitor, and where he became acquainted with Keats. *Foliage, or Poems Original and Translated* was published in 1818; *Hero and Leander* and *Bacchus and Ariadne* in 1819; and *Amyntas* (a translation from Tasso) in 1820. From 1819 to 1821 he also conducted the *Indicator*, which contains his best work as an essayist. In 1821 Shelley and Byron invited Hunt to join them in Italy,

where the trio were to found a quarterly magazine. But Shelley's death by drowning was the deathblow of his prospects in Italy. Hunt's sojourn at Florence was occupied chiefly with the editing of the *Literary Examiner* (twenty-seven numbers, 1823), the publication of *Ultra-Crepidarius: a Satire on Wm. Gifford* (1823), the writing of the 'Wishing Cap' papers for the *Examiner* (1824-5), and a poem, *Bacchus in Tuscany*, from the Italian of Francesco Redi. He also composed his *Christianism; or, Belief and Unbelief Reconciled* (1832), which was in 1853 enlarged and published as *The Religion of the Heart*. On his return to England, at the close of 1825, Leigh Hunt went to live at Highgate. In 1828 appeared his *Lord Byron and some of his Contemporaries*, a work which raised a storm of indignation. The same year found him editing the *Companion*, a weekly which ran to twenty-eight numbers. Two years later, after his removal to Epsom, he started the *Chat of the Week*, which died with its thirteenth issue. This was followed in October 1830 by the *Tatler*, a daily journal, literary and theatrical, which he wrote entirely himself; but it too came to an end after an existence of a year and five months. He next published (1832) *Sir Ralph Esher*, a historical romance of the days of Charles II.; while a collected edition of his *Poems*, with a lengthy preface, was also issued that year. In 1833 he began his residence at Chelsea, next door to Thomas Carlyle, with whom he soon became intimate. During his stay there his play *A Legend of Florence* was produced at Covent Garden Theatre, London, with a fair measure of success (1840). In 1834-5 he conducted *Leigh Hunt's London Journal*. He published in two separate volumes the dramatic works of Sheridan, and those of Wycherley, Congreve, Vanbrugh, and Farquhar, with biographical and critical notices (1840). *The Palfrey: a Love Story of Old Times* appeared in 1842; and in 1844 he produced a volume of selections from the poets, with comments, entitled *Imagination and Fancy. Wit and Humour* (another volume of selections in verse) and *Stories from the Italian Poets* followed (1846), and *Men, Women, and Books*, a collection of essays in two volumes, was issued in 1847; *A Jar of Honey from Mount Hybla* and *The Town* in 1848. *Leigh Hunt's Journal* (an old venture under a slightly different title), which existed little over a year, appeared in December 1850, and formed his last work as an editor. The

same year appeared the most popular of all his books, the *Autobiography*. In 1855 he published *The Old Court Suburb, or Memorials of Kensington*, succeeded shortly afterwards by a selection from Beaumont and Fletcher, with a preface and notes. Leigh Hunt takes his place in English poetry as the leader of the 'Cockney school.' His verse rarely attains a high standard of merit, and is now little read. As a critic he ranks high, but below Lamb, Coleridge, and Hazlitt. It is chiefly as an essayist of the Addisonian order that he claims attention. See *Poetical Works*, ed. by T. Hunt (1860); *Correspondence*, ed. by T. Hunt (1862); *Life* (with bibliography), by Monkhouse (Great Writers, 1893); *Clarke's Recollections of Writers* (1878); L. Cross's (*F. Carr*) *Characteristics of Leigh Hunt* (1878).

Hunt, RICHARD MORRIS (1828-95), American architect, was born at Brattleborough, Vermont. In 1842 he came to Europe, and was subsequently appointed inspector of works on the buildings connecting the Tuileries with the Louvre in Paris. His later life was spent in New York. In America he designed the Lenox Library and the United States naval observatory at Washington.

Hunt, THOMAS STERRY (1826-92), American chemist and geologist, born at Norwich, Connecticut; joined (1847) the Canadian Geological Survey; investigated the Archæan rocks. In masterly essays he set forth his 'crenitic' hypothesis, assigning to water a large share in the formation of crystalline rocks. He held professorial chairs at Laval and McGill universities, and at the Massachusetts Institute of Technology (1872). He died at New York. His publications include *Azoic Rocks* (1878), *The Domain of Physiology* (1882), *A New Basis for Chemistry* (1887), and *Systematic Mineralogy* (1891).

Hunt, WILLIAM HENRY (1790-1864), English artist of the English water-colour school, born in London. His first exhibits at the Royal Academy were in oil, but subsequently he devoted himself to water-colour, and became a brilliant colourist. His subjects were mostly country scenes, as the interiors of barns, cottages, and smithies, and fisher folk. *Too Hot, The Eavesdropper, Roses in a Jar*, are characteristic of his pictures.

Hunt, WILLIAM HOLMAN (1827), one of the greatest modern English religious painters, whose naturally mystical and symbolic mind, expressing a profoundly religious temperament, and natural genius made him a potent force in and truest exemplar of

the pre-Raphaelite movement. Born in London and educated in the Royal Academy Schools, he exhibited his *Hireling Shepherd* (Manchester) in 1853. His *Awakened Conscience* and his world-wide famed *Light of the World* (1854)—explained by Ruskin in the *Times*—showed the bent of this strange genius. To *The Light of the World* may be traced much of later religious art in England and abroad. Thereafter followed *The Scapegoat* (1856); *Christ discovered in the Temple* (1860), at Birmingham; *The Triumph of the Innocents* (1885), at Liverpool; etc. His great merit is to have brought into modern art a new note of intense spiritual emotion. See 'Pre-Raphaelite Brotherhood,' in the *Contemporary Review* for 1886, by Holman Hunt; *Art Annual* for 1893, by Archdeacon Farrar; and *Pre-Raphaelite Painters*, by Percy Bate (1899).

Hunter, SIR ARCHIBALD (1856), British general. He first saw service in Egypt (1884), being wounded at Ginniss (1885), and again at Toski (1889). In the Dongola expedition (1896) he commanded an infantry division at Firket and Hafir. He further distinguished himself at Abu Hamed (1897). On the outbreak of the Boer war he was chief of the staff of Sir Redvers Buller (1899), and also of Sir George White at Ladysmith. Then he headed the 10th Division under Lord Roberts, helped to relieve Mafeking (May 17-18, 1900), and compelled the surrender of General Prinsloo with 4,000 men in Caledon Valley (July 30). He had command of the troops in Scotland (1901-3), and now commands the forces in Bombay.

Hunter, JOHN (1738-1821), British admiral, was a native of Leith, Scotland; served in the Rochefort expedition (1757), at the capture of Quebec (1759), at the Dogger Bank (1781), and at Gibraltar (1782); made himself useful during the American war. In 1786 he helped Commodore Arthur Phillip to establish the colony of New South Wales; surveyed Port Jackson. He then carried a settling party to Norfolk I., and in 1795-1800 was governor of New South Wales.

Hunter, WILLIAM (1718-83), Scottish anatomist and obstetrician, born at Long Calderwood, Lanarkshire, and left Edinburgh for London (1741). He was in 1768 appointed the first professor of anatomy to the Royal Academy. His collection of specimens now forms the Hunterian Museum at Glasgow University. His great work, *The Human Gravid Uterus*, appeared 1774 (3rd ed. 1843). See *Life and Writings*, by Simmons (1783), and *Life* by Fox (1901).

Hunter, JOHN (1728-93), Scottish anatomist and surgeon, brother of William, was born at Long Calderwood, Lanarkshire. Joining his brother in London (1748), he became master of anatomy (1753), and house surgeon at St. George's (1756), and took part in the Belle Isle (1761) and Portugal (1762) expeditions, as staff surgeon. Then he practised in London (1763), and lectured on surgery. He discovered the circulation in the human placenta (1780), the method of tying the artery above the disease in aneurisms (1785), the establishment of collateral circulation by anastomosing branches of arteries; wrote on *Human Teeth* (1771), *Recovery of the Apparently Drowned* (1776), *Blood, Inflammation, and Gunshot Wounds* (1794). His museum in Leicester Square, London, was bought by the nation, and opened in 1813, when the Hunterian orations began. See *Life* by Ottley (1835); *Works* (1835-7); *J. Hunter and his Pupils*, by Gross (1881); and *Two Great Scotsmen*, by Mather (1894).

Hunter, WILLIAM ALEXANDER (1844-98), Scottish jurist, born at Aberdeen; called to the bar of the Middle Temple (1867); was subsequently professor of Roman law (1869-78), the principles of legislation, international law, and jurisprudence (1878-82), at University College, London. He was the author of *Roman Law in the Order of a Code* (3rd ed. 1897), and *Introduction to Roman Law* (5th ed. 1897).

Hunter, SIR WILLIAM WILSON (1840-1900), British Indian historian and geographer, was born at Aberdeen. As director-general of statistics, he planned and carried out the first Indian census (1872). After retiring (1887) to England, he interested himself in Oriental studies at Oxford and in literary work. Under his superintendence were produced a *Statistical Survey of India* (128 vols.), condensed into 9 vols. for the *Imperial Indian Gazetteer* (1881; 2nd ed. 14 vols. 1885-7); *Bengal and Assam* (22 vols. 1875-79); *Rulers of India Series* (1890-95). He also produced a *Dictionary of Non-Aryan Languages of India and High Asia* (1868), *Orissa* (1872), and *The Indian Empire* (1895). See *Life* by Skrine (1901).

Hunting. See FOX-HUNTING, DEER STALKING, OTTER-HUNTING, BIG-GAME SHOOTING, etc.

Huntingdon. (1.) Municipal bor., cap. of Huntingdonshire, England, on the Ouse, 18 m. S. of Peterborough. Near the town is Hinchbrook House, formerly the residence of the Cromwells. In All Saints' Church are several monuments of the family; and at

the grammar school, founded in 1260, Oliver Cromwell was educated. A fine bridge (13th century) connects it with Godmanchester. Industries include brewing, carriage-building, iron foundries, and nurseries. Pop. (1901) 4,261. (2.) Borough, cap. of Huntingdon co., Pennsylvania, U.S.A., on Juniata R., 22 m. E. of Altoona; has flour mills, car works, tanneries, and shoe factories. The seat of Juniata College (1876). Pop. (1900) 6,053.

Huntingdon, SELINA, COUNTESS OF (1707-91), English religious philanthropist; patroness of George Whitefield, founder of the Calvinistic Methodists, for

without any ecclesiastical authority. They were appointed and removed entirely at the pleasure of their patroness, and nothing could be more abject than the submission with which they bowed to 'her ladyship's' condescension on every occasion. Most of the churches of the 'Countess of Huntingdon's Connexion' have joined the Congregationalists.

Huntingdonshire, or **HUNTS**, inland co. of England. The s. and w. are undulating, with low hills; the E. belongs to the Fen district. The chief rivers are the Ouse in the s. and the Nene in the N. Agriculture and pasturing are leading industries, much

Huntington, DANIEL (1816), American painter, born at New York. He excels in landscape, historical subjects, and portraiture. He studied in Rome and Florence in 1836, and visited England 1851, when several portrait commissions were executed, notably *Sir Charles Eastlake* and the *Earl of Carlisle* (collection, New York Historical Society). He became president of the National Academy (1862-9), and again in 1877-91. Painted *President Lincoln*, *L. Agassiz*, *W. C. Bryant*, and others. One of his best known pictures is *A Toper Asleep* (1837).

Huntingtower and Ruthvenfield, vil. in Tibbermore par., Perthshire, Scotland, 21 m. W.N.W. of Perth. Huntingtower Castle, once known as Ruthven Castle, now in ruins, was the seat of the earls of Gowrie, and in 1582 was the scene of the 'Raid of Ruthven,' when the young king, James VI., was kidnapped by William, first Earl of Gowrie. Pop. (1901) 459.

Huntly, par. and tn. in Strathgogie dist., W. Aberdeenshire, Scotland, 41 m. N.W. of Aberdeen. Huntly or Strathgogie Castle was granted to the Gordons by Robert the Bruce. Dr. George MacDonald (1824-1905), the novelist, was born here in 1824. Pop. (1901) 4,136.

Huntly Family. See GORDON.

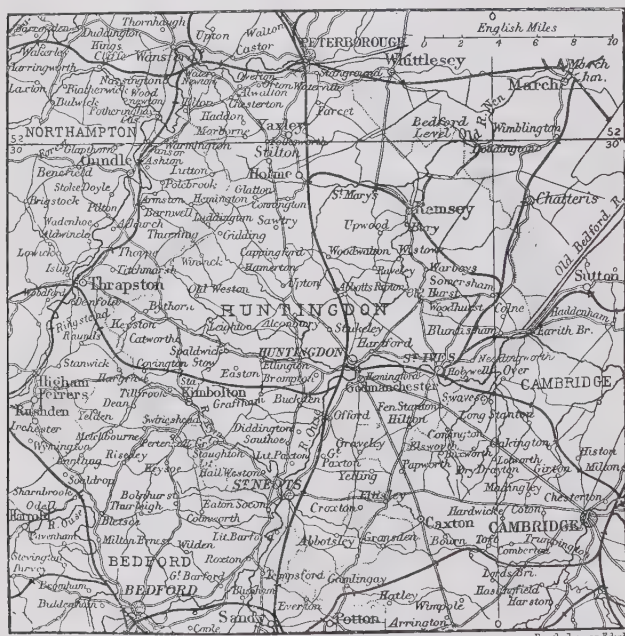
Hunts. See HUNTINGDONSHIRE.

Huntsville, tn., Alabama, U.S.A., co. seat of Madison co., 80 m. N.E. of Birmingham. Farming, cotton-growing, and stock-raising. Pop. (1900) 8,068.

Hunyad, co. of S.E. Hungary, between the Maros R. and the Carpathians, is very mountainous, but yields iron, gold, silver, copper, lignite, and timber, and possesses several mineral springs. Area, 2,676 sq. m. Pop. (1900) 302,710. Chief town, Deva.

Hunyadi Janos, mineral spring on the s. side of the Blocksberg in Budapest. Its waters are exported in great quantity.

Hunyadi, JANOS, or **JOHN CORVINUS HUNYADY** (?1395-1456), Hungarian soldier, born at Hunyad in Transylvania, and spent his life warring against the Turks. His most fruitful activity began in 1440, when he secured the election of Ladislaus of Poland to the Hungarian crown. After that he defeated the Turks near Belgrade (1441), and near the Iron Gates of the Danube (1442), but was defeated at Varna (1444), where Ladislaus fell. During the minority of the young king he was coregent and governor (1446-52) of Hungary. Deprived of support owing to the jealousy of the Hungarian nobles and foreign sovereigns, he was defeated on the



Huntingdonshire.

whom she built numerous chapels, and opened (1768) a seminary at Trevecca House, N. Wales, transferred (1792) to Cheshunt, Hertfordshire. In 1748 she appointed Whitefield one of her chaplains, and he preached to her and her friends at Cremorne House, Park Street, the audience including such notabilities as Lord Bolingbroke, Lord Chesterfield, and Horace Walpole. Under his influence fashionable ladies invited parties for prayer at each other's houses as they had been accustomed to invite parties for cards. In the churches which she set up throughout the country Calvinistic clergymen officiated according to the customs of the Church of England, but entirely

stock being fattened for market. Manufactures include bricks, paper and parchment, beer, malt, and leather and lace. Huntingdonshire returns two members to Parliament. Area (anc. co.), 365 sq. m. Pop. (1901) 57,773.

Huntington. (1.) Town, cap. of Huntington co., Indiana, U.S.A., on Little R., 48 m. E. by N. of Logansport; has railroad repair shops and limestone quarries. Pop. (1900) 9,491. (2.) City of W. Virginia, U.S.A., co. seat of Cabell co., on the Ohio, 50 m. W. of Charleston; manufactures steel, machinery, glass, etc., and has brewing. Pop. (1900) 11,923. (3.) Town, Suffolk co., New York, on Long I. Sound, 30 m. N.E. of New York. Pop. (1900) 9,483.

plain of Kosovo (1448). His last and most famous achievement was the relief of Belgrade (1456), in which he was assisted by the monk John Capistrano. See Chassin's *Jean Hunyadi* (1856).

Hunza-Nagar, towns, British India, on riv. Hunza, a trib. of riv. Gilgit. Hunza commands one of the routes to the Pamirs and Asiatic Russia.

Huo-lu, or **HUAI-LU**, tn. in Chi-li, China, at the foot of pass leading into Shan-si from Chi-li. It is a large entrepôt of coal, iron, and pottery from Shan-si, and of imports from Tientsin. 38° N., 114° 23' E.

Huon of Bordeaux, a romantic poem of the 13th century, belonging to the Charlemagne cycle, and was published by Gueussard and Grandmaison in *Anciens Poètes de la France* (1860). The story is familiar from a prose version by Bouchier, dating from 1454, of which an English translation was published in 1882 and 1895.

Huon Gulf, large inlet, Kaiser Wilhelm's Land, N.E. coast of German New Guinea, with several good harbours on its shores.

Hu-peh, prov., Central China; area about 70,000 sq. m.; situated between 30°-35° N. and 109°-116° E.; is mainly in the basin of the Han R. Tea, cotton, rice, wheat, rhea fibre, hides, vegetable tallow, wood and other oils, and tobacco are its chief exports. Coal mines are worked near the Yang-tse-kiang, and there are gold-washings in the valley of the Han. The province has a large boating population, whose principal centre is at Hankow. Wu-chang-fu is the capital. Pop. (1902) 33,500,000.

Hurd, RICHARD (1720-1808), English prelate and writer, was born at Congreve, Staffordshire. Appointed Whitehall preacher (1750), he afterwards became successively bishop of Lichfield and Coventry (1774), and of Worcester (1781). Chief works: *Dissertations on Poetry* (1757); *Moral and Political Dialogues* (1759), etc.; *Letters on Chivalry and Romance* (1762); *Uses of Foreign Travel* (1763); *Collected Works* (8 vols. 1811). See *Memoirs* by Kilvert (1860).

Hurdwar. See HARDWAR.

Hurdy-gurdy, a musical instrument from which the sound is obtained by the friction of strings of catgut or wire, stretched on a sounding board, the various notes being stopped by a simple apparatus of keys. In appearance it resembles the guitar and the lute. It has from four to six strings, two of which are carried direct to the tail-piece, and tuned in unison. The vibration of the strings is produced by a wooden wheel, which, being rosined, acts the part of a violin

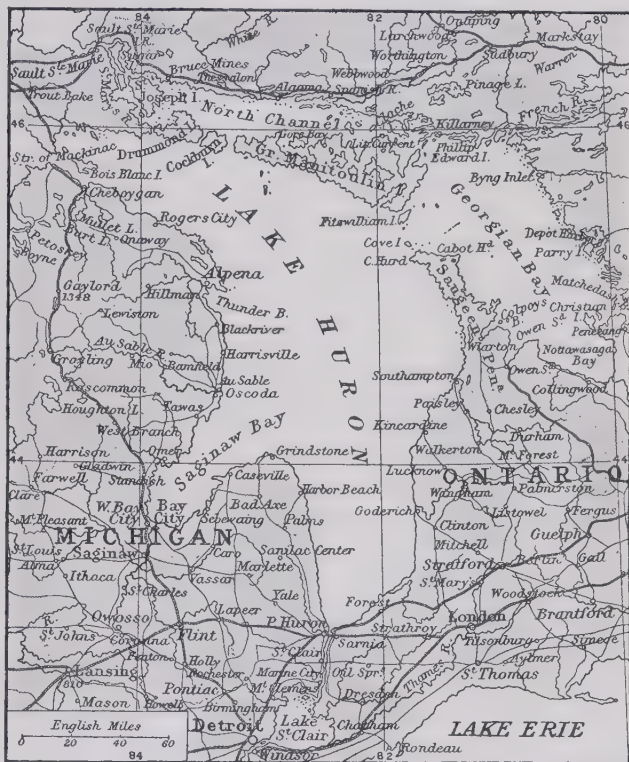
bow, and is turned by a handle at the end. The name is popularly applied to itinerant street pianos.

Hurlford, tn. in Riccarton par., Ayrshire, Scotland, 2 m. E.S.E. of Kilmarnock. Manufactures include iron, engineering, and articles of fireclay. Coal is mined. Pop. (1901) 4,401.

Hurlingham, dist., Fulham, London, England, near Putney Bridge; headquarters of the Hurlingham Pigeon-Shooting and Golf Club.

fish, is subject to violent storms. There are few harbours on the w. side except Saginaw Bay. The largest group of islands is that of Grand Manitoulin, belonging to Canada. See also GREAT LAKES.

Huronian, a name given by Sir William Logan to a group of rocks, mostly of metamorphic character, which underlie the oldest fossiliferous strata of the North American continent, and are largely developed in the vicinity of Lake Huron. Beneath them there is a still lower series, which



Lake Huron.

Bartholomew, Edin³

Huron, one of the great lakes of N. America, traversed by the boundary between the United States and Canada. It is connected with Lake Superior above by St. Mary R., and with Lake Erie below by the rivers St. Clair and Detroit. The Strait of Mackinaw connects it with Lake Michigan. The water surface is 23,000 sq. m. The drainage basin, including the area of the lake itself, is 75,300 sq. m. The mean level of its surface above the sea is 581 ft. Georgian Bay is the large arm in the E., extending into Ontario. Huron, which abounds in white-

he called the Laurentian, and which consists mostly of gneisses, while the Huronian comprises schists of many different kinds, as well as sandstones, grits, and igneous rocks. The Huronian is now regarded by American geologists as being a subdivision of the Algonkian. Its thickness is estimated at from 15,000 to 20,000 ft. Valuable masses of iron ore are found in this group.

Hurons, North American aborigines, an extinct branch of the Iroquois nation, whose name survives in the great lake, the northern shores of which were formerly

occupied by them. The Hurons never joined the Iroquois confederacy, but, on the contrary, were always at war with the Five Nations, by whom they were finally overwhelmed, exterminated, or dispersed in 1656. A few are said to survive amongst the Wyandots, now in Quapaw Reservation, Indian Territory.

Hurricane, the name applied to tropical cyclones which occur between 30° N. lat. and 30° S. They do not embrace such a large area as cyclones in higher latitudes, but are characterized by much lower barometric pressures and exceedingly violent winds, which sometimes attain a velocity of 100 miles or more an hour. In the W. Indies the region of hurricane winds takes the form of a circle or oval-shaped area

canes occur on an average about once a year, and are most frequent in August, September, and October, during which time about 70 per cent. of the whole have taken place. The minimum, 1'4 per cent., is in January and May. The cyclones in the Bay of Bengal move north-west from the neighbourhood of the Andaman Is. in lat. 12° N., to the mouth of the Ganges, in lat. 23°. They are most common in July, August, and September. In the centre of the disturbance there is a calm, but immediately surrounding this is an area of very heavy winds, while on the outside borders the wind is light. Dr. Meldrum of the Mauritius has made a careful study of hurricane phenomena, and has drawn up a code of rules for handling ships, which has

Hurst, HAL (1865), English painter, born in London; began by black-and-white work for newspapers and magazines in Philadelphia, New York, Paris, and London, finally settling in London, where he devoted himself to painting. Chief works: *Caught, Entangled, The Siren* (Royal Academy, 1896), *An Incarnation, Faith* (1897), *The Capture* (1898), and portraits, including *Mrs. Hal Hurst* (1896); also *The First Court of Edward VII.* by command of King Edward. In 1905 he exhibited *On the Sands* at the Royal Academy.

Hurst Castle, near Milford and Lynton, Hampshire, England, on a shingle bank 2 m. long, which juts into the Solent. Charles I. was a prisoner in the castle in 1648.

Hurstonmoeux, tn., 9 m. w.s.w. of Battle, Sussex, England. The castle, a fine ruin, dating from the reign of Henry VI., was dismantled in 1777. Trug baskets made of slips of peeled willow are manufactured. Pop. (1901) 1,500.

Hurtado de Mendoza, DIEGO (1503-75), Spanish statesman and man of letters, born in Granada; was ambassador to England in 1538, and subsequently to Venice and Rome; he also represented the emperor in the Council of Trent (1546). He retired from politics on the accession of Philip II. (1556), thenceforward devoting himself entirely to literature. His *redondillas*, in the old Spanish style, are full of sparkling wit; but as a poet he is most famous in the classical Italian form of hendecasyllabic verse, which he made popular. His best work lives, however, in prose. His *Guerra de Granada* (1627) is a model of classical Castilian and historical form. He is believed to have been the author of the first of the picaresque novels, *Lazarillo de Tormes* (1554). See biography in *Guerra de Granada* (1795), and *Obras Poeticas de Hurtado de Mendoza* (1610).

Husband and Wife. The relation of husband and wife is based upon contract, because the voluntary consent of the parties is necessary for the validity of a marriage. But marriage is a contract to pass beyond the sphere of contract, for it affects the status of the parties; and its legal consequences extend even beyond them, determining the legitimacy of their children, and giving rise to the relations of consanguinity and affinity. The relation is permanent, and is terminated only by death or divorce; and the personal and proprietary rights, duties, and liabilities of the spouses are to a large extent regulated by law, and beyond their own control. A will made

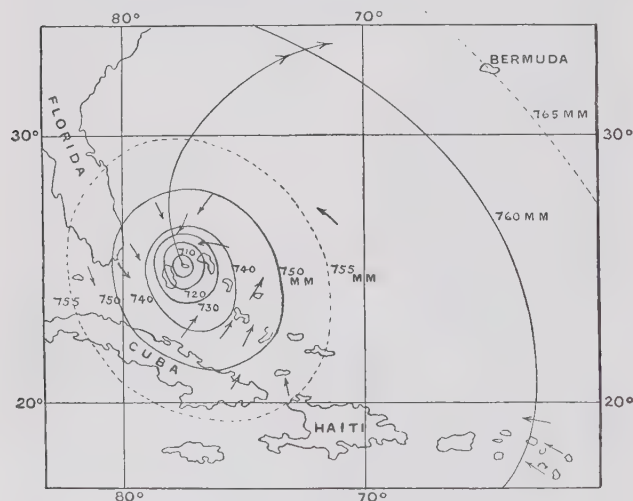


Diagram of Typical West Indian Hurricane.

(From Russell's 'Meteorology'.)

which is sometimes as much as 300 miles in diameter, but in the Bay of Bengal the cyclone whirl is only from 60 to 80 miles in diameter. The place of origin of most tropical hurricanes is at about 10° on either side of the equator. They usually move towards the west or north-west in the northern hemisphere, at a slow rate which bears no relation to the velocity of the wind accompanying the disturbance. The average velocity of the West Indian hurricane centres is at first about 15 miles an hour, diminishing to 10 miles as the centre approaches lat. 25° to 30° N., when the direction of motion changes to north-east. The general track of the disturbance when charted closely approximates to a parabola. In the W. Indies hurri-

proved of great value to mariners. In the China Sea severe hurricanes, known as typhoons, are frequently met with. See *STORM*; also *The Law of Storms in Eastern Seas*, by W. Doberck (7th ed. 1898); *Dove's Law of Storms* (trans. by R. H. Scott, 1862); *Espy's The Philosophy of Storms* (1841); *Meldrum's Note on the Form of Cyclones in the Southern Indian Ocean* (1873), and *Cyclone Tracks in the South Indian Ocean* (1891); *Eliot's Handbook of Cyclonic Storms in the Bay of Bengal* (pt. i.-v., 1890-3).

Hursley, vil., 4½ m. s.w. of Winchester, Hants, England. John Keble, author of the *Christian Year*, was vicar, and is buried in the churchyard. Richard Cromwell lived at Hursley Park. Pop. (1901) 800.

by either a man or a woman before marriage is revoked by marriage.

The husband has the right to choose the home, and the wife ought to live there. The wife's domicile is that of her husband, and changes with it. The husband has a right to the control and custody of his wife, but as far as this implies physical restraint, the right is of a very limited nature. The spouses are entitled to each other's society, and if either of them refuses to cohabit with the other, the injured party may petition the court for a decree of restitution of conjugal rights. If such a decree is disobeyed, it cannot be enforced by imprisonment, but it affords ground for a judicial separation. In Scotland, a deserted spouse may bring an action of adherence; but except where aliment is concluded for, it is not necessary to do so in order to obtain a divorce on the ground of desertion for four years.

In England and in Scotland, either husband or wife may recover damages for the death of the other if caused by the negligence of some one else. Formerly a husband could recover damages for a civil wrong done to his wife (e.g. assault or defamation), but now the wife can sue alone, and damages recovered are her separate property. In England, if a wife commits a crime in the presence of her husband, she is presumed, in the case of the less serious offences, to act under his coercion, and is excused. This principle does not apply to murder or treason, and probably not to robbery. A husband or wife may now give evidence for or against each other in civil cases, but not in criminal cases, unless one of them is charged with inflicting injury or violence upon the other. There are, however, important statutory exceptions to this rule.

A husband is liable to support his wife and family. If he does not do so, the wife may pledge his credit for necessities while she lives with him, or if she lives apart owing to his misconduct; only under a judicial order, however. If she becomes chargeable to the parish, the poor-law authorities may take proceedings against him, and he is liable to imprisonment. In England the wife may apply for a maintenance order under the Summary Jurisdiction (Married Women) Act, 1895. In Scotland she may bring an action against the husband for aliment. In England, since 1870, a wife having separate property can be compelled to support her husband if he becomes chargeable to the parish. In Scotland this is probably not the case. In Eng-

land, by the common law, marriage vested all the wife's personal property in her husband, and gave him the right to the rents and profits of her freehold property. Her leasehold property also became his, and he could freely dispose of it in his lifetime, but he could not dispose of it by will so as to defeat her rights if she survived him. The law has been greatly altered since 1870, and as it now stands under the principal Act of 1882, every woman married after Jan. 1, 1883, is entitled to hold as her separate property, and to dispose of, all real and personal property belonging to her at the time of the marriage, or which shall devolve on or be acquired by her thereafter; and every woman married before is entitled to hold separately all property coming to her after that date. A married woman may now enter into any contract in respect of, and to the extent of, her separate estate; and by the Act of 1893, every contract entered into by her, except as agent, is deemed to be entered into by her in respect of her separate property. A husband is not liable on his wife's contracts made during the marriage unless she has acted with his express or implied authority. The ordinary cohabitation between husband and wife carries with it the presumption of authority to pledge his credit for articles suitable to the style in which he chooses to live; but this presumption is rebuttable, as by the husband proving that he has made her a sufficient allowance, or, in some cases, that he has forbidden her to pledge his credit. In Scotland the husband was formerly absolutely entitled to the wife's movable property by his *jus mariti*, and also to the rents and produce of her heritable property. He was also her legal curator, and entitled to the administration of her property. The Conjugal Rights Act, 1861, frees from the husband's rights the products of the wife's industry, and property acquired after she has obtained a protection order or a judicial separation. The Married Women's Property Act, 1877, gives to a wife the earnings of any business carried on in her own name, and all gains arising from literary, artistic, or scientific skill. The Married Women's Policies of Assurance (Scotland) Act, 1880, enables a wife to effect a policy of assurance on her own or her husband's life for her separate use. The Married Women's Property Act, 1881, frees the whole of the wife's movable estate from the husband's *jus mariti*, but only excludes the income from his right of administration. She is there-

fore entitled to receive the income herself, but cannot assign the prospective income without her husband's consent, or dispose of the capital. The act also gives the wife the rents and produce of her heritable property freed from the *jus mariti* and right of administration of the husband. See articles on ALIMENT, ALIMONY, DIVORCE, DOMICILE, MARRIAGE, and PARENT and CHILD. For English law, see Eversley's *Law of the Domestic Relations* (1885); and for Scots law, see Fraser on *Husband and Wife* (1876).

Husi, or HUSHI, tn. Moldavia, Roumania, on r. bk. of Pruth, 65 m. by rail S.E. of Jassy; the see of a bishop. Vines and tobacco are cultivated. Here in 1711 the peace of the Pruth was signed between the Russians and Turks. Pop. (1900) 15,000.

Huskisson, WILLIAM (1770-1830), British statesman and inaugurator of free trade, was born at Birch Moreton Court, Warwickshire. Obtaining the friendship of Canning, he was appointed (1804) secretary of the Treasury. In 1814 he was chief commissioner of Woods and Forests, and in 1823 he succeeded Canning as M.P. for Liverpool. As President of the Board of Trade (1823-7), he was a strenuous advocate of free-trade principles, reducing many of the import duties. He became Colonial Secretary in 1827, but resigned in 1828. He met his death by accident at the opening of the Liverpool and Manchester Railway. See *Speeches*, with biographical memoir (3 vols. 1831).

Huss, or HUS, JOHN (?1369-1415), Bohemian reformer, known originally as Hussinecz, the village at the foot of the Böhmerwald in Bohemia where he was born. At the University of Prague he became imbued with the spirit of Wycliffe, whose writings he had become acquainted with through the instrumentality of Anne of Bohemia, consort of Richard II. of England. In 1402 Huss was appointed rector of the university, and at the same time began to preach in the vulgar (Czech or Bohemian) tongue in the capital. Six years later he was forbidden by Sbynko, archbishop of Prague, to preach or perform any priestly office within the diocese. But Huss, by inducing the university to support the king (Wenceslaus) of Bohemia in his policy with regard to the papal schism, became the champion and hero of the nationalistic sentiment. Archbishop Sbynko finally excommunicated him in 1410. In his retirement Huss wrote his principal book, *De Ecclesia*. In 1414 a great ecumenical council of the church met at Constance; and the reformer, summoned to attend the council, travelled to Constance

under the security of a free imperial pass. Nevertheless, three weeks after his arrival, he was seized and imprisoned; and upon his refusal to recant doctrines which the council pronounced to be heretical, false, and revolutionary, or to submit himself unconditionally to the authority of the council, he was condemned to the stake, and forthwith (July 6, 1415) led out and burned, 'the pale, thin man' dying as steadfastly and as bravely as he had lived and preached. Huss's Latin works were edited by Palacky in 1869, and his Bohemian by Erben in 1866. See Wratislav's *John Hus* (1882), and Loserth's *Huss and Wiclif* (1884).

Hussars, originally a distinct type of Hungarian mounted troops, raised by Matthias Corvinus in 1458 to operate against the Turks. The name, meaning 'twenty,' was derived from the fact that one man in every twenty inhabitants was commandeered. The increasing demand for cavalry possessing greater mobility than dragons led to the formation of light cavalry regiments on the hussar model. There are now twelve hussar regiments in the British army.

Hussites, WAR OF THE. The Hussite movement, which became prominent in the early years of the 15th century, was partly secular, partly religious. It was, on the one hand, an attempt on the part of the Slavs who inhabited Bohemia to check the Teutonic advance eastwards; it was, on the other hand, a protest against the corruption of the papacy. The death of Huss at the hands of the Council of Constance provoked violent indignation among the Bohemian reformers. In 1420 Pope Martin V. proclaimed a crusade against the Hussites, and German armies endeavoured not only to suppress the Hussite doctrines, but also to establish the authority of the Emperor Sigismund in Bohemia. From 1420-2 the Bohemians under Ziska triumphed. In 1427 a new crusade, in which Cardinal Beaufort took part, was proclaimed; but under Prokop, who since Ziska's death led the Bohemians, the Slavs were again victorious. In 1431 the German forces encamped outside Taus, but fled at the approach of Prokop. In 1434 civil war broke out; the Taborites, as the extremists in Bohemia were called, were defeated at Lipau, and a compromise was made with Sigismund, who entered Prague in August 1436.

Husum, tn., Prussian prov. of Schleswig-Holstein, near w. coast, 17 m. by rail w. of Schleswig; birthplace of the novelist Theodor Storm (1817-88). It has large cattle markets. Pop. (1900) 8,268.

Hutcheson, FRANCIS (1694-1746), Irish philosopher, was probably born at Drumalig, Co. Down, Ireland, but settled in Dublin as head of a private school. In 1725-7 his *Thoughts on Laughter* (suggested by Hobbes) and his *Observations on Mandeville's 'Fable of the Bees'* evoked sharp criticism from Gilbert Burnet in the *London Journal* (1728), and from John Balguy in his *Foundation of Moral Goodness*. From 1729 till his death Hutcheson was professor of moral philosophy at Glasgow. Hutcheson was a pioneer of the 'Scottish school' of philosophy, but his main importance is in ethics, in which he is an independent and suggestive follower of Lord Shaftesbury. A precursor of the utilitarians, he probably first used their favourite formula, 'the greatest happiness of the greatest number.' His works include *An Inquiry into the Original of our Ideas of Beauty and Virtue* (1725); *The Passions and the Affections*, and *The Moral Sense* (1728); *De Naturali Hominum Socialitate* (inaugural oration, 1730); *Philosophiæ Moralis and Metaphysicæ Synopsis* (1742); *System of Moral Philosophy*, with Memoir by Dr. Leechman (2 vols. 1755); *Logic* (1764). See Fowler's *Shaftesbury and Hutcheson* (1882), and William R. Scott's *Francis Hutcheson: His Life*, etc. (1901).

Hutchinson, city, Kansas, U.S.A., co. seat of Reno co., 140 m. w.s.w. of Topeka, with salt works. Pop. (1900) 9,379.

Hutchinson, JOHN (1615-64), English Puritan statesman and soldier, born near Nottingham, probably at Owthorpe; joined the Parliamentarians against the king, and successfully defended Nottingham Castle (1643). In 1646 he was returned to Parliament as member for Nottinghamshire, and later sat as commissioner for the king's trial, and signed the death warrant. At the restoration he was included in the Act of Amnesty, though subsequently imprisoned (1663-64) for alleged conspiracy. His *Memoirs* by his wife were published in 1806 (best ed. by Frith, 2 vols. 1885).

Hutchinson, JOHN (1674-1737), English theologian, born at Spenithorne, Yorkshire. In 1724-7 he published *Moses's Principia*, in which he held that the Old Testament contained not only the revelation of religious truth, but also a complete system of natural philosophy, and violently attacked Newton's theory of gravitation. His views were adopted by Duncan Forbes, Bishop George Horne, and others of considerable influence, and the 'Hutchinsonians' became a kind of recognized party. He wrote *Natural History of the Bible* (1725), *Data*

of Christianity (1735), etc. See *Life* by Spearman (1765).

Hutchinson, JONATHAN (1823), English surgeon, born at Selby, Yorkshire; became professor of surgery (1877), and president of the College of Surgeons (1889). He was on the royal commission appointed to inquire into the condition of London fever and smallpox hospitals (1884), and on the Vaccination Committee (1890-6). He has devoted much attention to 'educational museums' as a means of popular improvement. His writings include many important works on medicine and surgery, especially on leprosy and other diseases of the skin.

Hutchison, JOHN (1832), Scottish sculptor, born at Lauriston, Edinburgh; began to exhibit at the Royal Scottish Academy (1856), of which he became associate in 1862, academician (1867), librarian (1877), and treasurer (1886). Among his chief works are a colossal bust of *Harold Hardrada*, *Il Condotiere* in bronze, statue of *Robert Bruce*, and a bust of *Queen Victoria*.

Hutia (*Capromys*), or HOG-RAT, a name applied in combination to certain rodents found in the W. India Is. The hutia-couga (*C. pilorides*) is confined to Cuba, and is ratlike in appearance, though reaching a length of nearly two feet, exclusive of the long tail. It is a forest animal, partially arboreal in habit, and is relished by the inhabitants as food. Smaller species of the same genus occur in other of the W. India Is.

Hutten, PHILIP VON (d. 1546), German adventurer, born at Birkenfeld (cousin of Ulrich von Hutten). On Charles v. granting the Welsers of Augsburg the province of Venezuela, he joined one of their companies of merchant adventurers. In 1541 he started in search of the 'Golden City,' but was defeated by the Indians. Juan de Caravajal, having usurped the vicereignty, beheaded Hutten on his return to the coast. See Von Lange's *El Dorado* (1888).

Hutten, ULRICH VON (1488-1523), German author, was born at the castle of Steckelberg, near Fulda. He escaped from the monastery of Fulda in 1505, preferring the life of a wandering scholar. From 1512-14 he was in Italy, and studied law at Bologna; then for a time (till 1520) he was in the service of Archbishop Albert of Mainz. The murder of his cousin Hans von Hutten, in which Ulrich of Württemberg was implicated, gave him an opportunity of showing his powers as a pamphleteer. In 1517 the Emperor Maximilian crowned him poet laureate. At length his

outspoken and at times virulent criticism of the Roman Catholic hierarchy, and the support he gave the humanist Reuchlin in his long struggle against the Dominicans, led to his persecution. He found a shelter in the Ebernburg, Franz von Sickingen's stronghold, near Kreuznach, and soon became as noteworthy a champion of the reformation as he had been a zealous humanist. His early writings were all in Latin; he used the mother tongue only in his last years. Of his works, the best known are the *Dialogues*, some of which he translated into German in 1521, and a German poem (*Ich hab's gewagt mit Sinnen*). Hutter's complete works were published by Böcking (1859-70); David Friedrich Strauss wrote his *Life* (3 vols. 1858-60; 4th ed. 1878; trans. by Sturge, 1874).

Hutter, LEONHARD (1563-1616), German theologian, champion *par excellence* of Lutheran orthodoxy, being styled 'Lutherus Redivivus', was born at Nellingen, near Ulm, and became professor of theology at Wittenberg (1596), where he died. His *Compendium Locorum Theologicorum* (1610) was compiled for Christian II., Elector of Saxony.

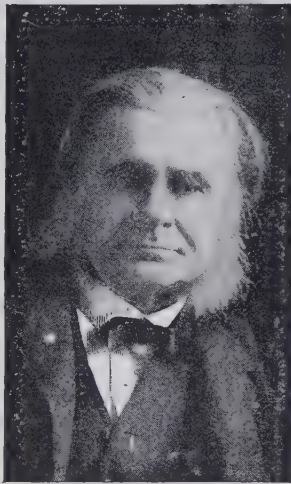
Hutton, CHARLES (1737-1823), English mathematician, born at Newcastle-on-Tyne; was in 1773 appointed professor of mathematics at the Royal Academy, Woolwich. Hutton's various papers in 1776-8 on the subject of *Force of Exploded Gunpowder and the Velocities of Balls*, read before the Royal Society, gained him the Copley Medal. Other works were a valuable abridgment of the *Phil. Transactions* (1809), and *Tracts* (1812) on the results of his experiments on gunpowder and gunnery.

Hutton, SIR EDWARD THOMAS HENRY (1848), English general, born at Torquay; fought in the Zulu war (1879), and first Boer war (1881). Having raised the mounted infantry corps, he commanded it in Egypt (1882), being present at Tell-el-Kebir, and during the Nile expedition (1884-5). He was commander of mounted infantry, and in charge of a special E. Transvaal column, during the second Boer war. In 1901 he was appointed to command the Australian Commonwealth forces, a post he resigned in 1904. He now (October 1905) is in temporary command of the 3rd Division of the Aldershot Army Corps.

Hutton, JAMES (1726-97), Scottish geologist, born at Edinburgh; was successively a doctor and a farmer (1752). He contributed data towards settling the theory of rain, showed that veins of granite are of igneous origin, and published *The Theory of the Earth*

(1795), the first attempt to explain the geological history of the earth in a truly scientific manner. This Huttonian theory substituted the processes of aerial denudation, oceanic deposition, and gradual upheaval, for the older ideas of cataclysmal changes. See Sir A. Geikie's *The Founders of Geology* (1897).

Hutton, RICHARD HOLT (1826-97), English theologian and journalist, was born at Leeds. At first editor of a Unitarian magazine, *The Inquirer* (1851-3), and then, with Bagehot, of a former *National Review* (1855-64), he became in 1861 joint editor and part proprietor of the *Spectator* (1861). In this capacity his life-work was mainly done, his weekly literary and religious contributions influencing a wide circle of thoughtful readers. Besides *Essays, Theological and Literary* (1871), he wrote *Lives of Scott* (1878) and *Newman* (1891).



Thomas Henry Huxley.

(Photo by Elliott & Fry.)

Huxley, THOMAS HENRY (1825-95), English man of science, a strenuous advocate of the doctrine of evolution, was born at Ealing, Middlesex. In 1846 he was appointed assistant-surgeon to H. M. S. *Rattlesnake*, then about to proceed on an exploring expedition to the coast of New Guinea and the Barrier Reef of Australia. During the voyage (1848) he wrote and sent home for publication his paper 'On the Anatomy and Affinities of the Family of the Medusæ,' which contains an extremely important scientific generalization. In 1854 Huxley succeeded Professor Forbes at the Government School of Mines in Jermyn Street, London, and in

that position his life was principally spent, though he also held the appointments of Hunterian professor at the Royal College of Surgeons (1863-9), and Fullerton professor at the Royal Institution (1863-7). Huxley's *Scientific Memoirs* have been republished in four vols. by Sir Michael Foster and Professor Ray Lankester (1898; suppl. vol. 1903); and his collected essays, some of them theological, and containing his brief but charming autobiography, were republished in nine volumes in 1893-4. It is by many of these essays and controversial papers that Huxley is best known popularly. Of his text-books, many, such as *Lessons in Elementary Physiology*, *Physiography*, *Anatomy of Vertebrated and Invertebrated Animals*, will long remain classics. He deliberately, and of set purpose, gave his life to the promulgation of what he regarded as truth, and strove primarily to inspire others, rather than to win laurels for himself. As a man his most distinguishing characteristic was his passion for 'absolute veracity.' See his *Life and Letters*, by his son Leonard Huxley (1900).

Huy, fort. tn., Belgium, prov. Liège, on the Meuse, 19 m. by rail s.w. of Liège. It has a rock-cut citadel and an interesting mediæval church. There are paper mills and distilleries, coal mines and iron works. The abbey of Neufmoustier was founded by Peter the Hermit, who is buried in it. Pop. (1900) 14,644.

Huygens, CHRISTIAN (1629-95), Dutch physicist and horologist, was born at the Hague (son of Constantijn Huygens). After devoting himself to mathematics, he gave attention to the improvement of telescopes, and discovered a better method of grinding and polishing lenses. With his new instrument Huygens was able to define Saturn's ring (1655); about the same time he applied the pendulum to regulate the movements of clocks, and presented the first pendulum clock to the States-general (1657). He visited England more than once, being made a fellow of the Royal Society (1663); and in 1665, at the invitation of Louis XIV., went to Paris, where he produced many important scientific works, returning to Holland in 1681. He defined the wave theory of light, which had been suggested by earlier investigators. His chief works were *Theorematum de Quadratura Hyperbolis, Ellipsis, et Circuli* (1651); *Horologium Oscillatorium* (1657); *Systema Saturnium* (1659). His *Œuvres Complètes* were issued by the Amsterdam Academy of Sciences (1888-95). See Boscha's *Christian Huygens* (Ger. trans. by Engelmann, 1895).

Huygens, CONSTANTIJN (1596-1687), Dutch poet, born at the Hague; served the House of Orange faithfully as a statesman for sixty years. One of the most original poets of Holland, he wrote in Latin *Momenta Desultoria* (2nd ed. 1655), and in Dutch *Korenbloemen* (3rd ed. 1824).

Huysmans, JORIS KARL (1848), French novelist, born in Paris, of Dutch extraction. He has written several works of considerable popularity, beginning with *Le Drageoir aux Épices* (1874), and *Marthe* (1876). At first a disciple of Zola, in his later works he has shown himself a devout Roman Catholic. His more recent novels are *La-Bas* (1891); *En Route* (1895; Eng. trans. 1896); *La Cathédrale* (1898; Eng. trans. 1898); *Le Bègue et St. Séverin* (1898); *Sainte Lydwine de Schiedam* (1901); *De Tout* (1902).

Huysum, JAN VAN (1682-1749), Dutch painter, born at Amsterdam; was one of the greatest painters of flowers and fruit, his pictures being remarkable for minute detail, brilliant colouring, and truth to nature. The English National and Dulwich Galleries contain good examples.

Hven, isl. at S. end of Sound, Denmark. It was here that the astronomer Tyge (Tycho) Brahe built the observatory of Uraniborg.

Hwang-ho. See YELLOW RIVER.

Hwang-poo, riv., Kiang-su, China, drains S.E. of the province. It joins the Yang-tse-kiang at Wu-sung (12 m. below Shanghai), where a bar necessitates the lighting of vessels of deep draught.

Hwen-thsang, or HIOUEN-THSANG (2605-664), Chinese monk and traveller, born near Ho-nan; entered a Buddhist monastery at thirteen, and in 629 made a pilgrimage to India to visit the sacred places. His memoirs give a faithful and valuable account of religious India at that time (631-644); and a biography of him, written by two of his disciples, also exists. Both works have been translated into French by S. Julien (1853 and 1857), and an abstract of the translations appeared in the 17th volume of the *Journal of the Royal Asiatic Society*. See Stanislas Julien's *Voyages des Pèlerins Bhoudhistes* (1853); *Hiouen Tsiang in Trübner's 'Oriental Library'* (1888).

Hyacinth, also known as JACINTH, a rock which includes the yellow, orange, red, and brown zircons. It is composed of zirconium silicate, is of sp. gr. 2.2 and $h = 6$, and is obtained principally in Ceylon, but also in various igneous and crystalline rocks in Bohemia, Norway, Greenland, Germany, and the Ural Mountains. In ancient times these

stones were much prized, and, though very hard, were cut into fine intaglio. Many of them are very beautiful, and have a fine lustre; but they have now gone out of fashion. Much of what is sold as hyacinth is really cinnamonstone-garnet, or hessonite.

Hyacinth, a genus of bulbous plants belonging to the order Liliaceæ. *H. orientalis* and its numerous varieties are specially valued by gardeners. Hyacinths are extensively used in spring bedding, a light soil being preferred. About eight inches should be allowed from bulb to bulb, and the bulbs should be planted in October, about three inches deep. Good bulbs are compact and heavy. They are easily forced if placed on the surface of pots of rich fibry compost and slightly pressed down in the soil, the whole being covered with ashes. As soon as the bulbs have become well rooted, the pots should be placed in warmth, and water liberally supplied. For very early forcing, the most desirable variety is the so-called Roman hyacinth (*H. o. albulus*), a variety of French extraction. They are extensively cultivated near Haarlem, in Holland.

Hyacinthe, PÈRE (1827), the monastic name of Charles Loyson, born at Orleans; attracted great crowds as preacher at St. Sulpice, Paris. Entering (1862) the Carmelite order, he was excommunicated in 1869 for persisting in denouncing the abuses of the church. He obtained a dispensation from his monastic vows, and became the Abbé Loyson; but he protested against the declaration of papal infallibility, and sided with the Old Catholics. In 1872 he married an American lady, and established a Gallican congregation at Paris (1879). See N. A. F. Puaux's *Le Père Hyacinthe et son Eglise* (1870); L. W. Bacon's *Father Hyacinthe* (1871); and his own *Mon Testament* (1893), and *Les Principes de la Réforme Catholique* (1878).

Hyacinthus, in Greek legend, was the son of the Spartan king Amyclas, and famous for his beauty. He was loved by Apollo, who was the innocent means of killing him. From his blood there sprang the hyacinth flower. His festival, the Hyacinthia, was one of the chief religious celebrations of the Spartans.

Hyades—i.e. the 'Rainers'—the name given by the ancient Greeks to seven stars in the head of the constellation Taurus; their rising simultaneously with the sun was held to portend wet weather. They were said to have been maidens entrusted by Zeus with the care of Dionysus, and afterwards placed among the stars.

Hyænas are the only living representatives of the family Hyænidæ, and are carnivores, related to the civets. They are ugly animals, with long front legs, short and broad heads, coarse shaggy fur, and short tails. The teeth are very powerful, and by means of them the hyænas can crush bones of great size. They live chiefly upon carrion or the bodies of animals killed by other carnivores, and seem specially fond of bones, devouring even those which have been picked clean by vultures. There are three living species of hyæna: the striped hyæna (*H. striata*), which extends from India to N. Africa; the brown hyæna (*H. brunnea*) of S. Africa; and the large spotted hyæna (*H. crocuta*) of Africa generally. The last named is apparently identical with the 'cave hyæna,' whose bones occur in caves in England and elsewhere in Europe. It is the most powerful of living forms, and not only carries off sheep and calves, but also attacks children and wounded men; like its allies, it is cowardly in face of danger.

Hybla, the name of three ancient towns in Sicily. (1.) On the S. slope of Mt. Etna, where Paterno now stands, which was called *Hybla major*. (2.) *Hybla minor*, afterwards known as Megara. (3.) *Hybla Heræa*, on the road from Syracuse to Agriguntum. One of these towns—it is uncertain which—was famous for the production of the Hyblæan honey, celebrated in poetry.

Hybrid, the name given to the offspring of the union of two distinct species; perhaps the most familiar example is the common mule, which is the result of a cross between ass and mare. Naturalists believed formerly that all hybrids were necessarily sterile. The belief was associated with the dogma of the permanency of species; for it was maintained that varieties could be distinguished from species by the fact that the product of a cross between the former would be fertile, between the latter sterile. When, therefore, Darwin attacked the doctrine of the permanency of species, he endeavoured to show that the distinction between species and varieties is one of degree and not of kind.

Fertile hybrids are not common among animals; but Darwin himself reared healthy young from a pair of hybrids between the domestic goose (*Anser ferus*) and the Chinese goose (*A. cygnoides*), which are very distinct species. Hybrids between these two species are apparently common, and quite fertile. Among plants not a few florist's flowers are hybrids, and are yet perfectly fertile. Such are many petunias, pelargoniums,

rhododendrons, crinums, and so on. On the whole, therefore, while hybrids among animals especially are usually more or less sterile, they are not invariably so, and among plants fertile hybrids are not very uncommon.

In some instances hybrids take after the male parent only; in other cases the characters of the female parent appear almost pure; while in the most interesting case of all, the offspring reverts to a distant ancestor.

On the animal side, the most detailed observations which have been recently made on hybridization have been those of Professor Cossar Ewart, who has succeeded

margarine factory. Pop. (1901) 32,768.

Hyde, EDWARD. See CLARENDON.

Hyde Park. (1.) See LONDON. (2.) Town, Norfolk co., Massachusetts, U.S.A., 8 m. S.W. of Boston, to which it forms a residential suburb. Cotton, paper, chemicals, and machinery are manufactured. Pop. (1900) 13,244.

Hyderabad. See HAIDARABAD.

Hyder Ali. See HAIDAR ALI. **Hydnum**, a genus of fungi, terrestrial and parasitic, characterized by the hymenium, or fructifying surface, being spread

cules seared the stumps with fire. The mouths were charged with a deadly poison, in which Hercules dipped his arrows.

Hydra, an ancient southern constellation, extending through many hours of right ascension, from the south of Cancer to the west of Scorpio. Tycho gave the name 'Cor Hydræ' to the *lucida*, a star of the second magnitude with an advanced solar spectrum. β Hydræ is a slowly revolving pair, and ϵ Hydræ has been disclosed as a ternary or quaternary system. The planetary nebula N.G.C. 3242 and the globular cluster Messier 68 occur in this constellation.



Species of *Hyænas*.

1. Brown hyæna (*H. brunnea*). 2. Striped hyæna (*H. striata*). 3. Spotted hyæna (*H. maculata*).

in breeding a most interesting series of zebra hybrids. See his *The Pennyuk Experiments* (1899) and *Guide to the Zebra Hybrids* (1900). For the theoretical bearing of the occurrence of hybrids on the theory of evolution, see the works of Darwin and Wallace, especially *The Origin of Species* (1859), and *Darwinism* (1890).

Hydaspes, now the Jhelum, in the Punjab.

Hydatid Cyst. See TAPE-WORMS.

Hyde, munic. bor. (incorporated 1881), 5 m. N.E. of Stockport, Cheshire, England. Cotton spinning and weaving are the staple industries; there are also manufactures of felt hats, engineering works, foundries, and a

overawl-shaped prickles or tubercles, which are distinct at the base. They have fleshy bodies, which in several species are edible, and in none poisonous. Among the best is *H. erinaceum*, the 'satyr's beard,' occasionally found in clefts of old oaks, its tan-coloured prickles generally measuring about six inches in diameter. Much commoner, and very delicious, is the 'urchin of the woods,' *H. repandum*, a pale yellowish fungus, found in groups in woods in autumn.

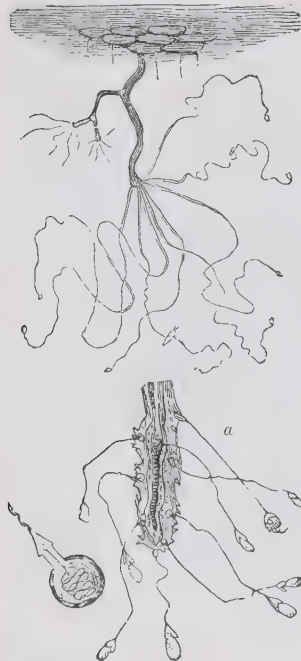
Hydra, a fabulous hundred-headed monster, the offspring of Typhon and Echidna, inhabiting the Lernean swamp in Argolis. As soon as any head was cut off it sprang up again, until Her-

Hydra, a small fresh-water polype found attached to weeds in ponds. It is a very simple coelenterate, and the slender body, which consists of a hollow cylinder, only reaches a length of from $\frac{1}{4}$ to $\frac{1}{2}$ inch. The terminal mouth is surrounded by tentacles armed with stinging cells, by means of which the hydra obtains the minute organisms on which it feeds. The body is very contractile, and sways about in the water; the colour may be brown, green, or colourless. There is a single central cavity, and the body-wall consists of only two layers of cells. When well fed, hydra buds, and liberates the buds; it differs from its marine allies, the zoophytes and sea-firs,

first, in not forming colonies, and, second, in that it does not produce swimming-bells or medusoids. Apart from budding, reproduction is effected by ova or spermatozoa. There are three British species—*Hydra viridis*, *H. fusca*, and *H. vulgaris*.

Hydragogues, in medicine the name given to the more active purgatives, which cause watery evacuations. See **APERIENTS**.

Hydrangea, a genus of deciduous shrubs belonging to the order Saxifragaceæ. They are grown under glass, in the cool greenhouse, or in the warmer districts of Britain in the open garden. Hydrangeas like deep, rich



Hydra (H. viridis).

a, Extremity of an arm; *b*, stinging cell.

soil, and plenty of water in the growing season. The commonest and most valuable species is *H. hortensis*, which bears its pink or blue flowers in large corymbs.

Hydrate, a term formerly applied to any compound formed by the combination of water with other substances, but now reserved for compounds containing water molecules that have undergone no rearrangement. It is not easy to draw a strict line, but such substances as salts containing water of crystallization, the compounds of sulphuric acid and water, or of propyl alcohol and water, are usually considered to be hydrates.

Hydraulic Machinery. Under this title we may include machines actuated by water, which are used for the generation, storage, transmission, and application of power. Hydraulic appliances, mainly for raising and distributing water, were known and used at a very early date, as, for instance, the water-wheel, which is now used, however, for the conversion of the natural energy of waterfalls into mechanical energy.

THE GENERATION OF POWER.
Undershot Water-wheels.—These are used for low falls up to, say, six feet, where the supply of water is plentiful and a high efficiency is not essential. The momentum of the moving water is partially utilized. The water enters the wheel (Fig. 1) with a velocity $= \sqrt{2gh}$ (where h is in feet and $g = 32.2$); it glides up the vane or float, turning the wheel; it comes to rest, and then leaves the wheel with very little horizontal velocity. It has been found that the best circumferential velocity is from 0.5 to $0.6 \sqrt{2gh}$. The thickness of the water-stream should not exceed ten inches, and its breadth should be at least four inches less than the width of the wheel. The efficiency is usually low, but in the best wheels (as improved by Poncelet) it may be as high as 60 per cent.

Breast Wheels.—In these the water acts by its weight only, as a reference to Fig. 2 will show. It drops through apertures in the end of the pen-trough *P* into the buckets of the wheel, turning the latter merely by its weight. The breast *B* serves to some extent to prevent waste of water. Fairbairn improved the wheel greatly by introducing curved sheet-iron instead of wooden buckets, by only partially filling the buckets and ventilating them, and by providing a better means—usually through a segmental spur-wheel fastened to the water-wheel near its circumference—of giving off the power. The illustration gives a good idea of Fairbairn's construction: the segmental gate *p*, moved by a pinion actuated through a governor somewhat like that of a steam-engine, being employed to regulate the speed of the wheel under varying loads. The efficiency may be as high as 70 or even 75 per cent.

Overshot Wheels.—In these the weight of the water, and also to some extent its energy of motion, are utilized. The water passes over the summit of the wheel, as shown in Fig. 3, and falls against and into the buckets. This type of wheel is used for falls of from ten feet to seventy

feet. The efficiency may be as high as 75 per cent.; but there is usually considerable loss of water, and it does not clear itself well in the wheel-pit owing to the backward direction of motion with which the water leaves the wheel. Fairbairn's statement of 60 per cent. probably represents an average efficiency.

Reaction Wheel or Scottish Turbine.—This wheel was formerly a good deal used, and may be regarded as the prototype of the modern reaction turbine. It is shown in elevation and plan in Fig. 4. The water drops from the pen-trough into the wheel, which consists of an upright part shaped like an inverted truncated cone, fitted with radiating pipes bent in one direction at their outer ends—*viz.* the backward direction, as referred to that in which the wheel rotates. If the wheel were at rest, the water would issue with a velocity v (neglecting friction) $= \sqrt{2gH}$. It is not difficult to show that v is

$$\text{approximately} = 8 \sqrt{H + \frac{r^2}{64t^2}}$$

where r is the distance of the centre of each orifice from the axis, and t the time of one revolution in seconds. If u be the forward velocity of the orifice, the efficiency will be about $= \frac{(v-u)u}{gh}$

—a rule which is similar to that used for turbines, but requires modification if friction be considered. The efficiency does not increase as v increases (though the rule indicates that it does) beyond a certain limit, the practical efficiency rarely exceeding 60 per cent., and being usually much less. The main reason of this is obvious: the water leaves the wheel horizontally, with a large amount of energy of motion unutilized. On this account, and to save space, the modern turbine is now used.

Turbines may be divided into two great classes—*viz.* pressure or reaction turbines, and impulse turbines.

Reaction or Pressure Turbines.—The outward radial-flow pressure turbine (Fig. 5) has many points of resemblance to the old Scottish wheel just described. The water enters the wheel (*a*) through fixed guide passages (*s*), which are curved so as to give the water a certain velocity in the direction of the wheel's motion. When the water enters the turbine wheel, or moving part, it passes along curved vanes, giving up its momentum to the wheel; and it finally leaves, being urged in such a direction that it has no more momentum in the direction of the wheel's motion. Herein lies the advan-

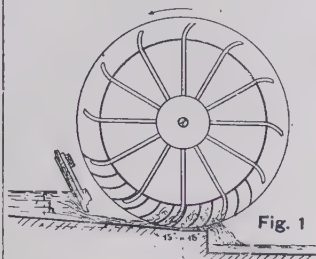


Fig. 1

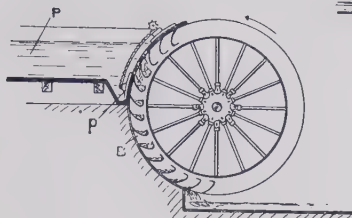


Fig. 2

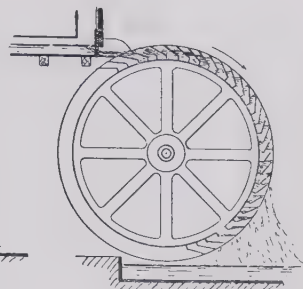


Fig. 3

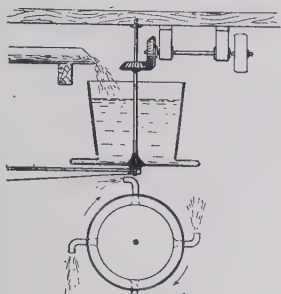


Fig. 4

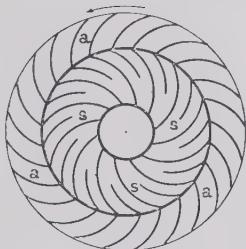


Fig. 5

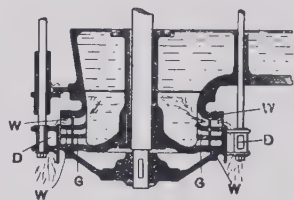


Fig. 6

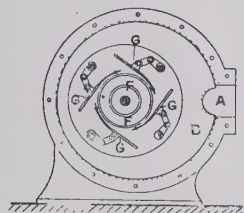


Fig. 7

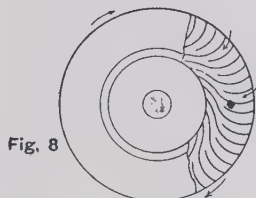


Fig. 8

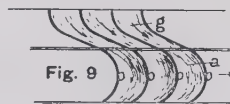


Fig. 9

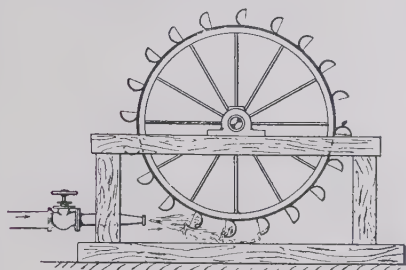


Fig. 10

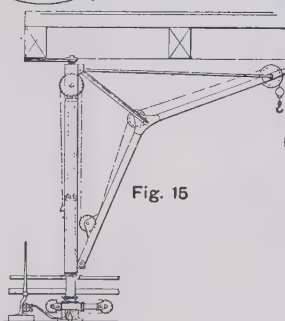


Fig. 11

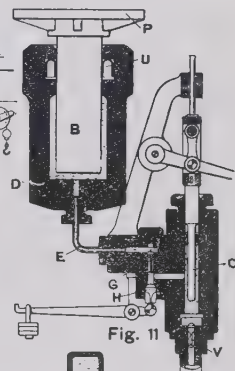


Fig. 12

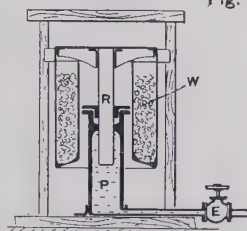


Fig. 13

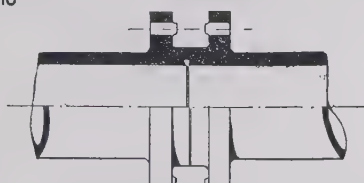


Fig. 14

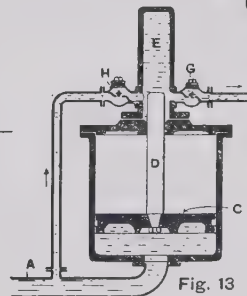


Fig. 15

tage of the turbine over its old prototype. The great fundamental law for turbines is that the efficiency (neglecting losses at entrance) = $\frac{vw}{gh}$ where v = velocity of inlet surface, and w = the water's velocity of whirl. The turbines of the Niagara Falls Power Company are good examples of the outward-flow pressure type. One of these is partly shown, in section, in Fig. 6. The water passes through fixed guides G into the wheel W , which turns with the upright shaft S . The speed is regulated by the cylindrical gate D , actuated by a powerful governor. Usually outward radial-flow turbines govern badly, as any increase of speed is attended by an increased flow, and hence increased power, due to centrifugal force. For this and other reasons, the inward radial-flow turbine, such as that of the late Prof. James Thomson (brother of Lord Kelvin), has often been preferred. One of these is shown in Fig. 7. The water enters the chamber B through A , and is finally guided into the wheel F by the movable guides G , which can be altered in direction by a hand-wheel or governor. Thus the speed can be regulated. An enlarged view of the wheel, partly in section, is shown in Fig. 8. It is essential to their efficiency that they be quite filled with water under pressure.

In *Impulse Turbines* (sometimes called Girard turbines, after their inventor), the wheel-passages are at all times only partially filled with water, which is under a small pressure only. A good idea of the shape of the fixed guides g , and of the wheel vanes a , may be obtained from Fig. 9. Pressure turbines only are admissible for high falls, and where great power is required from a comparatively small machine; but impulse turbines are better suited for low falls, especially where considerable variations in the power demand are anticipated. Mixed-flow turbines of both types have proved fully as successful as any of the others. One of these, a downward and inward flow wheel, gave a maximum efficiency of 87 per cent., with 70 per cent. efficiency at half-gate opening.

The *Pelton Wheel* is much used for high falls, even up to 2,000 feet. It consists, as shown in Fig. 10, of a wheel with a series of cups fastened at equal intervals round its circumference. A jet of water is directed into these cups, or rather against the edge of the partition between two cups, which are shaped so as to return the water in a direction parallel to that which it had

before entry. The wheel should run at a circumferential velocity equal to half that of the jet. The efficiency is from 80 to 86 per cent. under favourable conditions. The Pelton wheel is somewhat difficult to govern for very variable loads. In the modification of it due to Mr. Cassel, the wheel is in two halves, the junction being along a central plane at right angles to the axis. The halves are held together by springs; but on an increase of speed beyond the normal, the two halves are forced apart owing to the increased centrifugal force of two masses, each of which is fastened to the end of the central member of a T lever pivoted to a spider, which is keyed on the shaft between the two halves of the wheel. Thus the jet passes either partially or entirely between the two portions of the wheel, and the speed is accurately regulated.

STORAGE AND TRANSMISSION OF POWER.—The principle underlying the action of hydraulic machines connected with the storage and transmission of power was enunciated by Pascal more than two hundred and fifty years ago in the following words: 'If a vessel full of water, closed on all sides, has two openings, the one a hundred times as large as the other, and if each be supplied with a piston which fits it exactly, then a man pushing the small piston will exert a force which will equilibrate that of 100 men pushing the large piston, and will overcome that of 99.' Though this principle was known so long ago, little practical use was made of it until 1796, when Joseph Bramah invented the cup-leather packing for hydraulic presses.

Hand Hydraulic Press.—This is shown, in section, in Fig. 11. The pump-plunger c , on its upward stroke, draws in water through the upward-opening valve v . On the downward stroke, v closes and g opens, allowing the water to pass along the pipe E to the press cylinder D , which we may suppose to be already filled with water. The influx of this new supply causes the ram B , with its platen P , to rise. This platen forms the bottom of a strong box into which the material to be pressed has been introduced. The rising of P , therefore, presses the material into a smaller bulk. The water is prevented from escaping from D , round B , by the cup-leather U , which is a circular tunnel of leather contained in a suitable recess in the press cylinder. The water, in trying to escape, gets inside U , and presses it more and more

tightly against the ram as the pressure increases. A safety-valve H opens and allows some water to escape, should the pressure accidentally exceed the limit considered safe. Large presses, worked by steam pumps arranged in groups, are now employed, special arrangements being introduced to save time and to increase the efficiency of the plant. Applications of the hydraulic press to the expression of oil from seeds, the squirting of lead through a die to form a lead pipe, or through a hole to form a rod, with many other interesting modifications, can be obtained from R. G. Blaine's *Hydraulic Machinery* (2nd ed. 1905).

Hydraulic Accumulator.—Hydraulic machinery for the storage and transmission of power owes its success largely to the late Lord Armstrong. He at first used a reservoir on a high tower as a storehouse for energy, pumping water into it. About 1850 he hit on the hydraulic accumulator as a means of producing an artificial head. It consists, as will be seen from Fig. 12, of a wrought-iron weight-case W , filled with slag, concrete, ballast, or pig-iron; this case rests on, and is strongly attached to, a ram R working in a vertical press cylinder P , connected with the mains conveying the water (under pressure) to the various machines to be worked. When only a few machines are working, the weight W rises until, near the top of its stroke, it pushes up a lever or lifts a weight, thus stopping the pumping-engine. When more machines start, the weight falls, starting the engine; thus the system is rendered automatic and sufficiently elastic, the pressure in the mains is kept

constant and about = $\frac{W}{A}$ (where W is the weight and A the area of the cross-section of the ram), and the weight in its higher position contains a store of energy which may be drawn upon when necessary. An accumulator may be thrown out of action by closing the valve E .

Hydraulic Intensifier, or Intensifying Accumulator.—Sometimes water at a low but fairly constant pressure is available, and, instead of using a loaded ram, this water is allowed to form the load. In Fig. 13, water from the domestic supply mains acts on the ram C ; whilst the water in E is forced out, along G , at a pressure

= $60 \times \frac{\text{area of cross-section of } C}{\text{area of cross-section of } D}$ if friction be neglected. There are suitable valves at H and G , so that in the back stroke water

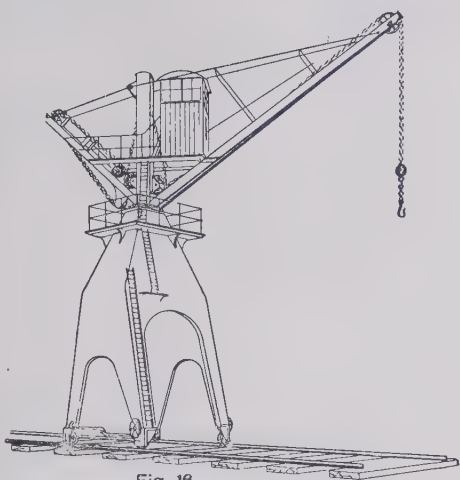


Fig. 16

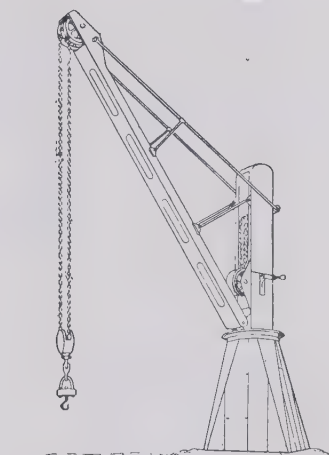


Fig. 17

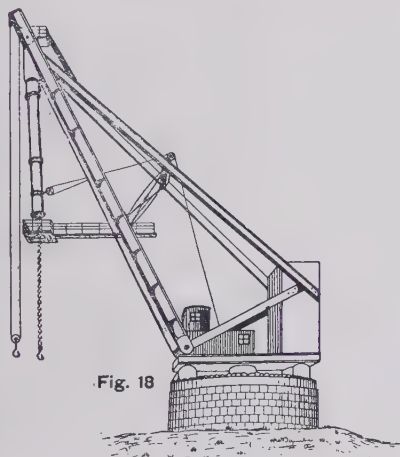


Fig. 18

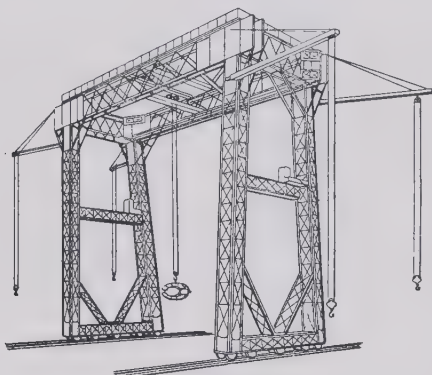


Fig. 19

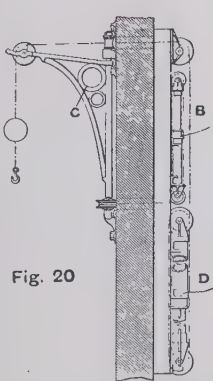


Fig. 20

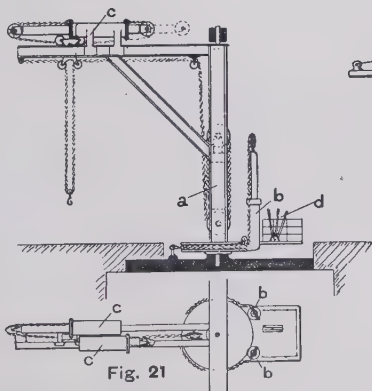


Fig. 21

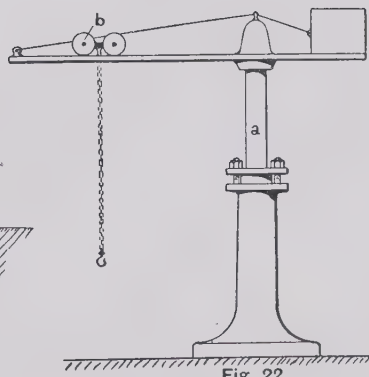


Fig. 22

(at the lower pressure) is drawn in through H, the valve G being shut.

Hydraulic Mains.—The pipes conveying pressure water from the accumulators to the various hydraulic machines actuated thereby are usually of cast-iron, though steel pipes are now coming into use. Fig. 14 shows a part section, part elevation, of two of these cast-iron pipes near the joint. The thickness of metal varies with the pressure and diameter of the pipe. For a 6-inch pipe to convey water at 750 lbs. per square inch the thickness is $1\frac{1}{2}$ inches, whilst for a pressure of 1,120 lbs. per square inch the thickness is $1\frac{3}{4}$ inches. By making the pipe of large diameter, less power is wasted in transmission; but the pipe must be thicker, and is more expensive. It has been shown that the most economical diameter for cast-iron pipes is $\sqrt[3]{07E}$ when the pressure is 700 lbs. per square inch, and $\sqrt[3]{05E}$ for a pressure of 1,120 lbs. per square inch, E being the horse-power sent into the pipe.

Cost of Power.—To calculate the cost of power, 'multiply the cost of 1,000 gallons of the water (in pence) by 86, and divide by the pressure of the water in pounds per square inch;' this will give the cost (in pence) of one horse-power for one hour.

THE APPLICATION OF HYDRAULIC POWER.—Mr. Tweddell was, next to Lord Armstrong, the pioneer in this branch of engineering.

Hydraulic Cranes.—Lord Armstrong's first triumph was the hydraulic crane. It is somewhat like an ordinary pulley-tackle reversed, the hydraulic power being applied by a ram acting at the load-end of the tackle, the weight raised occupying the place usually assigned to the hand or power. Thus the ram moves much more slowly than the load raised. Lord Armstrong's first crane had three cylinders, the rams of which actuated one cross-head, from which the lifting chain passed over multiplying sheaves to the crane jib. Either one, two, or all the rams could be put under pressure, and hence the amount of water (or hydraulic power) required could be varied with the load raised. Without some such arrangement any hydraulic machine raises its smallest load, or does its least amount of work, at the same cost as its greatest.

Small Platform Crane.—Fig. 15 shows a crane suitable for lifting up to 30 cwt., where an overhead support for the top socket is available. The lifting cylinder

is in the centre of the upright crane-post, and the slewing or turning cylinders are in a box at the base of the pillar. An oscillating joint in the bottom socket of the pillar conveys the pressure water to the lifting cylinder. The multiplication of motion is 4 to 1.

Dock and Quay Cranes.—A movable crane for loading and discharging cargo is shown in Fig. 16. The multiplication is here 6 to 1, and the lift 50 feet, the slewing cylinders being on an inclined frame at the back of the pillar. Hand-gear is provided for moving the crane along the quay, and screw chocks or feet are fitted to take the weight off the wheels when lifting a load. In some cases the radius of the jib can be altered by a 'derricking' motion controlled by a separate cylinder. A heavy fixed crane is shown in Fig. 17; in this the lifting ram, in the centre of the pillar, is telescopic, acting as a cylinder for another and smaller ram, which alone is employed for light loads. For heavy loads both rams move together; hence the larger only need be considered as the lifting ram. When the smaller ram only is used, the outer one is held by a catch shown at the side of the pillar. Fig. 18 shows a 100-ton roller-path crane. The crane turns on a ring of rollers to diminish friction. The load is lifted by a direct-acting hydraulic cylinder suspended from the jib. The lift is, in this case, 50 feet, and the radius 55 feet. When used for smaller loads of, say, 30 tons, the chain tackle is used, the hydraulic cylinder referred to being swung in towards the centre out of the way.

Hydraulic Gantry.—A hydraulic gantry, similar to those erected recently for Messrs. Harland and Wolff at Belfast, is shown in Fig. 19. It is an immense structure, running on rails, and forming the support for three hydraulic travellers, as well as four hydraulic travelling jib-cranes for suspending punching and riveting machines and for handling material. The gantry is moved along the rails by hydraulic engines situated at two of the lower corners near the rails, the hydraulic cylinders and valves for operating the jib-cranes being situated near the engines. The motion of the travellers is controlled by hand-chains from the level at which the riveting machines are worked. The span of the gantry is 100 ft.; the clear height from the rail level to the under side of the cross-girders is 98 ft., the clear space between the vertical legs being 95 ft.

Warehouse Cranes.—The appli-

cation of hydraulic power to the movement of goods in warehouses has given rise to various forms of crane. The wall-crane, shown in Fig. 20, is of a usual type. It consists of a bracket-shaped frame C, turning in bearings attached to the wall of the warehouse; the hydraulic cylinders which control the turning movements are shown at D. Sometimes the bearings project some distance from the wall, thus allowing greater angular motion. As these cranes lift only comparatively small loads, no attempt is made to vary the power except by throttling.

Foundry Cranes.—For small loads a crane somewhat similar to that shown in Fig. 15 is used; but the load is suspended from a trolley running on the horizontal tie, the radius of the load being varied by hand. For larger loads, up to 15 tons, a crane of the kind shown in Fig. 21 is employed, in which the lifting cylinder *a* is in the centre of the pillar, the turning cylinders *b, b* being just behind and to each side of the pillar. The load is traversed, or altered in radius, by hydraulic cylinders, *c*, attached to the horizontal member of the crane. Thus all the movements are performed by the aid of hydraulic power, the valves which control the various movements being operated by levers, *d*, from a little platform behind the crane.

Cranes for Steel Works.—The type of crane which has been most employed in steel works is the centre-crane (Fig. 22), in which the whole superstructure is rigidly connected to and rests on the lifting ram *a*. Thus the crane and its load are both raised through the required lift, which, however, must be small. The load is suspended from a little trolley, *b*, running on the horizontal cross-beam of the crane. This beam is tied, and the load balanced, as indicated in the illustration. Such a crane is wasteful of water, as the smallest load raised demands the same expenditure of energy as the largest, each requiring the full lift to be performed by the lifting ram itself. To minimize this loss, a centre-crane with three rams has been much used. These rams are side by side, the two outer being small and the central one large. This central ram is acted on by pressure water from the mains uncontrolled by a valve, and the pressure on it serves to balance the dead weight of the crane itself, the water being returned to the mains again as the crane is lowered. The small rams raise the net load: if it is large, both are in action; if small, only one.

Hydraulic Lifts.—Hydraulic lifts or hoists are distinguished

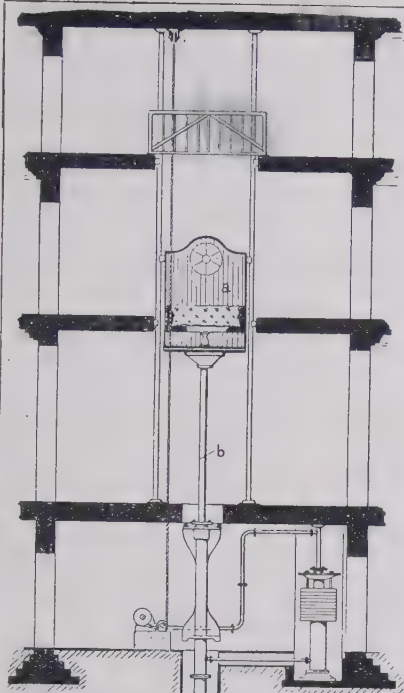


Fig. 23

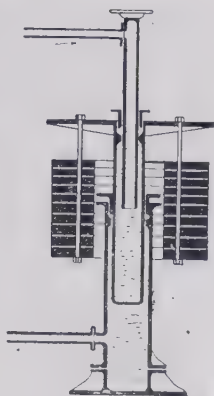


Fig. 24

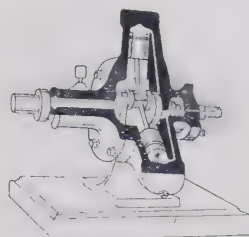


Fig. 26

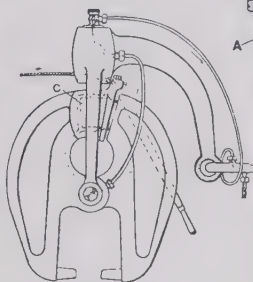


Fig. 28

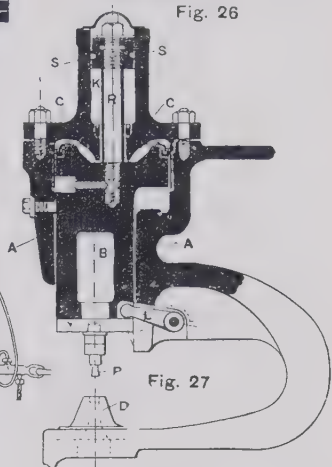


Fig. 27

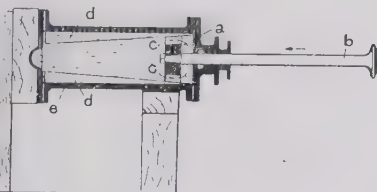


Fig. 30

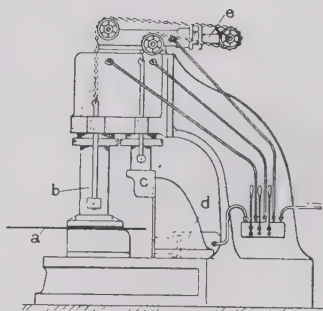


Fig. 29

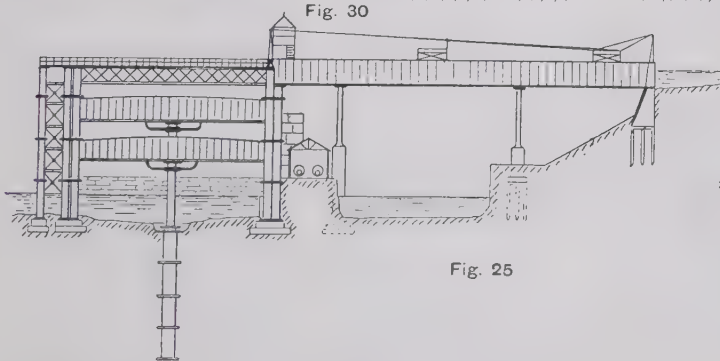
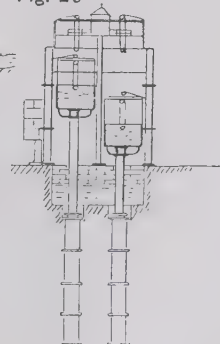


Fig. 25



from cranes by the fact that the load raised must always take the same vertical path, being placed in a cage or room which travels on fixed vertical guides.

Direct-acting Passenger Lift.—This, the simplest and safest appliance of the kind known, consists, as indicated in Fig. 23, of a cage or room, *a*, resting on and attached to a long ram, *b*, which works in a corresponding hydraulic cylinder, *c*, sunk deeply into the earth in the cellar of the building. The ram, with its room and passengers, moves up under the influence of the water pressure on the ram, which, resting on unyielding water, cannot fall, and even if a valve be opened or a leak occur, it can only fall comparatively slowly. It is, however, an expensive and uneconomical arrangement. The cost of sinking a well for the cylinder from sixty to a hundred feet deep, the cost of the cylinder and ram, the weakness of the latter as a strut, and last, but not least, the daily cost of filling this cylinder with pressure water each trip, render this type of lift unsuitable except for small heights, and in places where pressure water is cheap. For instance, the weight of the ram may be, say, 1,500 lbs., that of the cage 1,220 lbs., whilst the load raised may be 1,120 lbs. It is evidently more economical to balance the 2,720 lbs. of dead weight in some way, and only draw on the pressure supply for the raising of the 1,120 lbs. of net load. For this purpose counter-weights may be employed; but their use considerably diminishes the safety of the lift, as serious accidents have occurred through the breaking of the counter-weight chains or ropes, or by the giving way of the attachment of cage and ram, the former being then pulled up with great rapidity by the counter-weights.

Hydraulic Balances are much more usual; one of these may be seen to the right, in the cellar, in Fig. 23. It consists, as shown in section in Fig. 24, of a movable cylinder, which is weighted and moves on two fixed hollow rams. On the downward journey of the lift this weighted cylinder moves up, giving space for a certain portion of the water displaced by the lift ram in the descent. The energy stored in this weighted cylinder is then available for raising, or partially raising, the dead weight of the lift, leaving only a comparatively small external supply to be furnished from the mains each journey. The hollow rams are not alike in diameter. This conveys a diminished pressure to the lift ram, and hence the latter may be of sufficient diameter for strength.

Suspended Lifts.—The lifts in use in the finest buildings in Britain and in America are mainly of the suspended type. In these the cage is suspended usually by four wire ropes, each of which is strong enough to bear the whole load with safety. The ropes are pulled up by a short ram which works in its cylinder, and has multiplying sheaves like a hydraulic crane. No deep well is required for the cylinder, and the speed of the lift may be much higher than in the case of the direct-acting apparatus. Every lift of this kind must be supplied with a safety device, the function of which is to arrest the cage should the ropes break or be payed out too rapidly.

Canal Lifts.—Not only have hydraulic lifts been provided for passengers and goods, but even a section of a canal with one or two boats in it is moved from one level to another by hydraulic power. One of these lifts, erected some years ago on the river Weaver, in Cheshire, to take boats from the river to the canal (50 ft. higher), is depicted in Fig. 25. It consists of two wrought-iron tanks, each 75 ft. long and 15½ ft. wide, carried on a ram 3 ft. in diameter, which works in a vertical hydraulic cylinder. Each end of each tank is furnished with a gate. When one trough is up the other is down, the upper forming part of the canal, the lower part of the river, each being filled with water up to a certain level. A boat is floated into each tank, the gates are closed, the upper tank descends whilst the lower rises, only a comparatively small amount of external power being required, owing to the nearly perfect balance of the weights. By keeping the level of the water in the ascending trough six inches less than in the descending one, only one-twelfth of the energy required has to be supplied by the hydraulic pumping plant.

Hydraulic Engines.—It is often necessary to use hydraulic power for driving shafts and machines which have a rotary motion. To do this a hydraulic engine may be employed. It is like a steam-engine, but is driven by water under pressure instead of by steam. One of these, the Brotherhood hydraulic engine, is shown, partly in section, in Fig. 26. Three trunk pistons work on one crank, the water being admitted to act on each in turn by the valve shown to the right. As the pistons move, the crank turns, and the valve also turns, so that when a piston has completed its forward stroke the valve has turned into such a position as to uncover the exhaust opening and allow the water to

escape. An engine of this type uses the same volume of water each revolution whether it be fully loaded or not. Various arrangements to meet this defect have been devised. The rotary engine of Mr. Rigg, in which the stroke of the engine is varied to suit the load, is perhaps the most successful. The engine is a three-cylinder one, like that just referred to; but the cylinders and pistons rotate about a common centre, whilst the distance of the common junction of the piston-rods (i.e. the crank-pin) from this centre is varied, usually by a centrifugal governor. Thus the stroke, and hence the volume of water per stroke, vary with the power demand. The engine is too complicated to be fully described here. Hydraulic engines have many important applications, not the least interesting of which is the opening and closing of bridges, such as the Tower Bridge in London. Dock gates are also in some cases opened and closed in the same way, but the direct action of the ram of a hydraulic cylinder on each gate is more usual and is preferable.

Hydraulic Punching Machine.—Fig. 27 illustrates such a machine in section. *B* is the main ram, to which the punch *P* is attached. When *B* is forced out of its cylinder *A* by water acting at *C*, the punch is forced through the plate previously placed over *D*. *K* is a small piston packed at *S* so as to move water-tight; its rod is *R*. The space under *K* being always open to pressure, as soon as the water is cut off from the main ram the punch is withdrawn by the action of *K*, the upper side of which is open to the atmosphere. The rams *B* and *B* are kept water-tight by the *U* leathers shown. The lever *L* is connected to the land-lever which controls the working valve, and as soon as the punch has pierced the plate, *C* is opened to exhaust, and *K* withdraws the punch.

Hydraulic Riveter.—A view of a portable hydraulic riveter is shown in Fig. 28. The jaws, each with its die, are movable about a central axle, the hydraulic cylinder *C* and its ram being curved. The egress of the ram under the action of the pressure water, conveyed to the riveter by a flexible pipe, causes the dies to close on the rivet and plates, thus not only forming the rivet, but pressing the plates tightly together at the proper instant. Large stationary and some portable riveters have a solid framework, with the cylinder and ram over one of the dies.

Hydraulic Forging Presses and Plate-benders. The forging press was first used in 1860 by Messrs. Whitworth for forging ingots for

big guns. There is no special feature in its construction which demands remark, the heated metal being simply subjected to a blow or squeeze by the egress of a ram. In a large press this squeeze may have a force equal to the weight of 10,000 tons.

Hydraulic Flanging Press.—The illustration (Fig. 29) shows one of the largest of these machines. The plate *a*, having been properly centred, is turned round on a segment, seized by one ram, *b*, and held firmly whilst another ram, *c*, descends and turns the flange over, the operation being completed by a third ram, *d*, which comes forward and squares up the flange. A separate ram, *e*, under constant pressure, is used to give motion in the exhaust direction.

Hydraulic Machinery on board Ships.—The manipulation of heavy guns on ships of war, with the provision of recoil-absorbing apparatus, and the moving of heavy turrets, and operations of a similar nature, are best performed by hydraulic power. The magazines are fitted with hydraulic capstans, purchases (or cranes), and hoists for dealing with the ammunition. The absence of risk of fire or explosion is one of the chief reasons for the adoption of this class of power for these purposes.

Hydraulic Brake.—Hydraulic appliances may also be used to destroy motion or waste energy. The simplest appliance of this kind is the ordinary dash-pot, which is a cylinder filled with oil or water, containing a piston which either fits loosely or has holes in it for the passage of the fluid. The body whose motion is to be 'damped' acts on the piston, forcing it along the cylinder, the fluid passing through the holes or round the piston, and by friction wasting the energy of the moving body. In a better form of apparatus the piston fits the cylinder, the two ends of the latter being connected by a pipe through which the fluid passes as the piston moves. A valve or tap in the pipe can be closed to a greater or less extent. In the case of a hydraulic buffer-stop, it is necessary that the fluid shall pass fairly easily at first when the motion of the piston is quick, and less easily as the motion becomes slower. This is sometimes effected by having holes in the cylinder communicating with a space outside it, fewer holes being available in front of the piston as it advances. Another method is that due to Mr. Langley (Fig. 30), in which the piston *a* to which the buffer-stop *b* is attached fits its cylinder fairly well, except at two portions, *c*, *c*, where tapering rectangular strips, *d*, *d*,

are inserted lengthwise in the cylinder *c*. The stop is full out when the piston is at the right-hand end of the cylinder, and in that position there is considerable space between the strips and the piston for the passage of the fluid. As the stop moves in under the action of a train, these spaces become smaller and smaller, so that the fluid has greater and greater difficulty in passing. But since fluid friction varies as the speed for slow velocities, and nearly as the square of the speed for moderate velocities, it will be seen that this arrangement, if properly designed, may be made to oppose the required kind of resistance to the moving body it is intended to arrest.

POWER WASTE IN TRANSMISSION.—Like all other systems for transmitting power, there is in this a certain loss during transmission, and it is often very important to be able to determine the amount. To do this, one or two fundamental laws must be understood. Thus, the total energy of 1 lb. of water moving at a velocity of *v* feet per second, at a height of *h* feet above datum, and under a pressure of *p* lbs. per square inch, is, by Bernoulli's law, $h + \frac{v^2}{2g} + 2.3p$ foot-lbs. In ordinary mains *h* may be neglected, and *v* is, or should be, small, so that the last term, $2.3p$, gives (very nearly) the energy in the 1 lb. of water. Suppose we send *E* horse-power into the pipe, how much will arrive at the distant end? Let the pipe be straight, *l* feet long and *d* feet in diameter. D'Arcy's experiments tell us that in such a case every 1 lb. of water loses $4\frac{fl}{d}$ times its kinetic energy in passing along the *l* feet of pipe, where *f* is a coefficient = $.005 \left(1 + \frac{1}{12d}\right)$ for a smooth pipe. It will be seen that for a new six-inch pipe *f* = .0058, and, in fact, that every 1 lb. loses $.0058 \times \frac{4l}{d} \left(\frac{v^2}{2g}\right)$ foot-lbs. of energy in *l* feet of such pipe. Now if *Q* cubic feet per second be the flow in the pipe, $Q \div \frac{\pi}{4}d^2 = v$; and hence the loss per lb. (taking $2g = 64.4$) is $\frac{4}{64.4} \times \frac{fl}{d} \left(\frac{4Q}{\pi d^2}\right)^2$ foot-lbs. Now *Q* cubic feet weigh $62.4Q$ lbs., and hence the loss per second is $\frac{62.4 \times 4}{64.4} \times \frac{fl}{d} \left(\frac{4Q}{\pi d^2}\right)^2$ Q foot-lbs. Since every lb. possesses $2.3p$ foot-lbs. of energy in virtue of its pressure *p*, the energy sent into the pipe per second is $2.3p \times 62.4Q$ foot-lbs.;

and since foot-lbs. per second $\div 550$ = horse-power, the horse-power sent in is $E = \frac{1435}{550} \times pQ =$

$.26pQ$. The loss of energy per second is given above, and $\frac{1}{550}$ of it is the horse-power lost. In other words, the horse-power wasted by friction in the pipe is $\frac{4 \times 16 \times 62.4}{64.4 \times (3.1416)^2 \times 550} \left(\frac{flQ^3}{d^5}\right) = .01153 \cdot \frac{flQ^3}{d^5}$.

It is, however, more convenient to express this loss in terms of the power sent in. Since $E =$

$.26pQ$, $Q = \frac{E}{.26p}$, and the horse-power wasted (call it *w*) = $\frac{.01153 \times flE^3}{(.26)^3 p^3 d^5}$, or $w = \frac{0.06562 flE^3}{p^3 d^5}$.

The formula shows the great importance of having the pressure as high as possible, but above all of having the pipe as large as is consistent with the higher cost of such pipe. If, for instance, we send 200 horse-power into a pipe six inches in diameter and three miles long, the pressure at entrance being 700 lbs. per square inch, there are 45 horse-power wasted in transmission, even if the pipe be new and smooth. If the pipe be one foot in diameter, the loss is only $\frac{1}{8}$ of this; and if the pipe were properly designed, so that $d = .07 \times 200^2 = .6779$ foot or 8.13 inches, the waste would only be 9.48 horse-power. The waste of power shows itself in the form of reduced pressure, and the data given above enable the pressure at the distant end to be calculated. Thus, in the example cited, 155 horse-power arrive at the place three miles distant; and since $HP = .26pQ$, and *Q* is everywhere the same, the pressure will be simply proportional to the power. In other words, the pressure at the distant end will be $\frac{700 \times 155}{200}$, or only 542

lbs. per square inch. The following are a few of the authorities which may be consulted: Fairbairn's *Mills and Millwork* (4th ed. 1878); article on 'Hydromechanics,' in *Encyclopædia Britannica* (9th ed.); *Proceedings of the Institute of Civil Engineers* (vols. xcix., cv., etc.); *Proc. Mechanical Engineers* (1853, etc.); *Lecture on Water Motors*, by Prof. Unwin (1885); various papers by R. H. Tweddell; *Engineering* (May 22 and June 5, 1891); *Hydraulic Machinery*, by R. Gordon Blaine (2nd ed. 1905); Marks's *Hydraulic Power Engineering* (2nd ed. 1905); William and Hazen's *Hydraulic Tables* (1905); and Box's *Practical Hydraulics* (13th ed. 1902).

Hydraulic Ram. See PUMPS.
Hydraulics. See HYDRO-MECHANICS.

Hydrazine, $\text{H}_2\text{N}-\text{NH}_2$, is a colourless liquid (b.p. 114°C) that can be prepared by heating hydrazine hydrate with barium oxide. It is alkaline, uniting with acids to form salts, and with water to form a stable hydrate. Hydrazine forms many derivatives in which its hydrogen atoms are replaced by alkyls, the most important of these bodies being phenylhydrazine, $\text{C}_6\text{H}_5\text{HN}-\text{NH}_2$, an oily liquid (m.p. 17° , b.p. 241°C , sp. gr. 1.1) which is a useful test for aldehydes and ketones.

Hydrea, now **Hydra**, a small isl. in the Gulf of Hermione, on the S.E. coast of Argolis, is famous for the gallant part its inhabitants played in the Greek war of independence. On its N.W. coast is the fortified seaport town of Hydra, with an active trade. Its seamen are reputed the best in the Levant. Pop. 6,500.

Hydrides, in the widest sense of the term, are the compounds formed by the union of hydrogen with a single other element, but the name is more often restricted to the compounds of hydrogen with metallic or semi-metallic elements. Thus, HCl and H_2O would be looked upon rather as a chloride and oxide than as hydrides, which NaH , Pd_2H , and SbH_3 might fairly be considered to be.

Hydriodic Acid, hydrogen iodide, HI , may be prepared by acting on red phosphorus and iodine with water, or, in solution, by passing hydrogen sulphide into water in which iodine is suspended and filtering off the sulphur precipitated. Hydriodic acid is a colourless, sharp-smelling gas that fumes in moist air and is much heavier than air. It is very soluble in water, forming a fuming monobasic acid that soon turns brown on exposure to light from the liberation of iodine. Hydriodic acid does not take part in combustion, and is decomposed when strongly heated. The iodides, or salts of hydriodic acid, are crystalline, and, as a rule, soluble in water. Silver iodide is employed as a sensitive salt in photography, and potassium, and occasionally sodium, iodide in medicine. Potassium iodide is a valuable remedy in syphilis, and is also employed to lessen the secretion of milk and bring about the absorption of the products of inflammation. It is also an expectorant, and is useful in lead poisoning; but if taken in excessive quantities, it causes a kind of poisoning known as 'iodism.'

Hydrobromic Acid, hydrogen bromide, HBr , is prepared by heating potassium bromide with

phosphoric acid, or by cautiously dropping bromine into red phosphorus made into a paste with water. Hydrobromic acid is a heavy, colourless, fuming gas with a pungent smell. It is very soluble in water, forming a fuming solution that acts as a monobasic acid, and is decomposed in the light with separation of bromine. The bromides, or salts derived from hydrobromic acid, are crystalline, and, as a rule, soluble in water. They are employed in photography, silver bromide being one of the principal salts that are sensitive to light. Bromides of potassium, sodium, and ammonium are also used in medicine, being powerful depressants of the nervous system and hypnotics. They are employed with great benefit in the treatment of epilepsy, insomnia, and other nervous troubles; but if taken habitually, they are apt to set up a variety of poisoning known as 'bromism,' with dangerous local and mental symptoms.

Hydrocarbons are the compounds of hydrogen with carbon, and may be looked on as the parent substances from which all organic compounds are derived. There are many classes of hydrocarbons, of which the following are the chief:—(1) The paraffins, of general formula $\text{C}_n\text{H}_{2n+2}$, which are saturated compounds with the carbon atoms in an open or branched chain; (2) unsaturated hydrocarbons of several series, such as the ethylene series, of general formula C_nH_{2n} , the acetylene series, C_nH_n , etc., all of which will unite with other elements, like chlorine, without rearrangement of the molecule; (3) hydrocarbons with a ring structure, such as the benzene, naphthalene, and anthracene hydrocarbons, in which the carbon atoms are arranged in one or more closed chains. See V. von Richter's *Organic Chemistry*, trans. Smith (1886).

Hydrocele, a swelling of the scrotum, caused by the effusion of fluid into the coverings of the testicle or of the spermatic cord. While it may result from inflammatory conditions, or from an injury such as a blow, the cause cannot always be ascertained. It forms a tense, elastic, smooth swelling, and it is distinguished from other conditions in the same situation by its translucency, which is apparent when the tumour is held between the observer's eye and a lighted candle or a strong lamp. It may be mistaken for a rupture; but a hydrocele swelling gives no impulse under the hand when the sufferer coughs. Again, it is not, like strangulated hernia, associated with vomiting or pain.

Congenital hydrocele, however, may give an impulse with coughing.

Palliative treatment consists in frequent tapping with a trocar and cannula. In the hydrocele of young children, cure may be effected by constant wearing of a truss, or by the external application of iodine. Radical cure in adults is effected by tapping and subsequently injecting iodine; or by incising the sac, turning the covering (not the outside skin) inside out, and stitching it in that position. The injection of a ten per cent. solution of chloride of zinc has lately been recommended as efficacious, and as causing no pain or inflammation.

Hydrocephalus, or water on the brain, is a condition of the head caused by excess of fluid under the brain coverings or in the brain cavities (ventricles). It produces distention of the head, and in extreme cases compression of the brain. The cause of congenital hydrocephalus is unknown. It may be so pronounced as to render birth difficult, and it often leads to convulsions and defective development. A hydrocephalic child seldom lives more than four or five years. Sometimes congenital hydrocephalus is arrested naturally, and leaves little trace except in the size of the head. Acute hydrocephalus is the result of tubercular meningitis, and occurs most frequently in children between the ages of two and five years. Chronic hydrocephalus (acquired) in adults may result from cerebrospinal meningitis, or from occlusion of the foramen of Majendie by a tumour, or it may be idiopathic, i.e. arising independently, apart from other disease. Hydrocephalus is, however, rather a symptom than a disease; but acute cases are generally accompanied by the ordinary signs of inflammation, and acquired chronic hydrocephalus, when arising from the pressure of a tumour, is often associated with intense headache and drowsiness, which may end in coma and death. Treatment is, as a rule, unsatisfactory. Some have advocated bandaging, in the hope that continued pressure might dispel the symptoms; others have punctured the cranial or the spinal membranes, and have withdrawn part of the superfluous fluid. Such measures may give slight temporary relief, but operative interference in hydrocephalus is futile and unwise.

Hydrochloric Acid, hydrogen chloride, HCl , is found in nature in some volcanic gases. It is prepared by heating common salt with concentrated sulphuric acid, the operation being carried out on the commercial scale by heating the mixture in an iron pan

set in a furnace, when the following reaction takes place: $\text{NaCl} + \text{H}_2\text{SO}_4 = \text{NaHSO}_4 + \text{HCl}$. The sodium acid sulphate obtained is capable of decomposing another molecule of salt if heated to a higher temperature, as in a reverberatory furnace— $\text{NaHSO}_4 + \text{NaCl} = \text{Na}_2\text{SO}_4 + \text{HCl}$; the residue of sodium sulphate or 'salt cake' being utilized in the glass or alkali industry. Commercially, the hydrogen chloride obtained is passed up towers or 'scrubbers,' down which a stream of water trickles and dissolves the gas. Hydrogen chloride is a pungent-smelling, colourless, fuming gas that is heavier than air and very soluble in water, forming a fuming monobasic acid—hydrochloric acid, 'spirits of salt,' or muriatic acid. Hydrogen chloride does not take part in combustion, and is not decomposed in light or on heating; but its hydrogen may be displaced by metals such as zinc or sodium, and its chlorine by manganese dioxide. The series of salts the chlorides, derived from hydrochloric acid, are widely distributed and of great importance. In general they are crystalline, stable, and soluble, though some are decomposed by water, especially if evaporated with it. Common salt, sodium chloride, NaCl , is the most important of the chlorides, and in fact is the parent substance from which almost all chlorine and its derivatives are obtained. Hydrogen chloride is used for the preparation of chlorine and its compounds, as a pickle for cleaning metals—*e.g.* iron, before galvanizing, etc.—and in many manufactures. Common salt, besides its use as a preservative, is a necessary article of food with all animals living on vegetable diet. It is used in medicine, internally, as an emetic; externally, in baths for the relief of sciatica and rheumatism, and, injected in solution, to replace loss of blood.

Hydrocyanic Acid, or **PRUSSIC ACID**, HCN , was discovered by Scheele in 1782, and is a product of the decomposition of the amygdalin present in almonds and other plants. An aqueous solution may be prepared by distilling potassium ferrocyanide with diluted sulphuric acid, or by acting on potassium cyanide with tartaric acid. The anhydrous acid can be prepared from the solutions by dehydration with calcium chloride and by distillation. Hydrocyanic acid is a light, colourless liquid (m.p. -14°C , b.p. 26°C), with an odour like bitter almonds that is not perceptible to many people. It is intensely poisonous, even if only absorbed through the skin, or if its vapour is inhaled; whilst a single drop of the anhydrous acid, if swallowed,

causes instantaneous death by stoppage of the heart, smaller doses causing paralysis of respiration and of the spinal cord, and deep insensibility. Where the heart has not been stopped, immediate emetics, followed by injection of ether or brandy, inhalation of ammonia, and artificial respiration, may be of service. Chemically, hydrocyanic acid is a feeble acid, faintly reddening litmus. It forms salts, the cyanides, that are in some respects like the halides, but are poisonous, and enter into complex acid radicles like the ferrocyanides and ferricyanides. Aqueous solutions of hydrocyanic acid do not keep well, except in presence of a trace of mineral acid, becoming hydrolyzed to ammonium formate. In dilute solutions, hydrocyanic acid is used medicinally, having a soothing effect if applied to an itching skin, whilst internally it is sedative, allays vomiting, and relieves coughing. Potassium (or sodium) cyanide is useful as flux and reducing agent, as fixing agent in photography, but chiefly as a solvent for gold. It is prepared on the large scale either from the ferrocyanide or sulphocyanide, or more recently through barium cyanide formed in the electric furnace from barium carbonate, carbon, and producer gas.

Hydrodynamics. See **HYDROKINETICS** and **HYDROSTATICS**.

Hydro-Extractor, or centrifugal, is a machine for separating liquids, such as water, from solids, by whirling the mixture in a power-driven perforated or wire cage surrounded by a casing to collect the liquid that flies out through the openings.

Hydrofluoric Acid, or **HYDROGEN FLUORIDE**, HF , is obtained in aqueous solution by heating calcium fluoride (fluor spar) with concentrated sulphuric acid in a leaden retort and condensing the gas given off in water, $\text{CaF}_2 + \text{H}_2\text{SO}_4 = \text{CaSO}_4 + 2\text{HF}$. If potassium hydrogen fluoride is prepared by half neutralizing the aqueous acid, the anhydrous acid can be obtained by the distillation of the dried salt in a platinum retort. Hydrofluoric acid is a colourless liquid, boiling at 19°C , and giving off most irritating and dangerous fumes. It mixes with water, and is a strong acid, which, though monobasic, forms double salts of the alkali metals by union of a molecule of salt and acid. Hydrogen fluoride is valuable on account of its solvent action on silica and silicates, being largely used to etch glass; the gaseous acid produces a frosted line, and the solution, except when mixed with other ingredients, a clear one. The salts derived from hydrofluoric acid, or fluorides, are, with the exception

of those of the alkali metals, insoluble in water. Calcium fluoride is the most important, and forms clear cubical crystals that are often beautifully coloured by impurities. Besides its use as a source of hydrofluoric acid, it is employed as a flux in metallurgical operations.

Hydrofluosilicic Acid, H_2SiF_6 , is obtained by leading silicon fluoride, obtained by the action of concentrated sulphuric acid on a mixture of fluor spar and fine sand, into water, hydrated silica being simultaneously formed. Hydrofluosilicic acid is only known in solution, which is colourless, sour, and behaves as a dibasic acid, forming somewhat insoluble potassium and barium salts.

Hydrogen, H , 1'008, is a gaseous element that chiefly occurs in nature in combination with oxygen as water. It is most conveniently prepared on the small scale by displacement from diluted sulphuric acid by zinc, $\text{Zn} + \text{H}_2\text{SO}_4 = \text{ZnSO}_4 + \text{H}_2$. Kipp's apparatus being suitable for the process. On the large scale, scrap iron may be substituted for zinc, or steam may be passed over red-hot iron, or water electrolysis. The gas is purified by passage through a solution of potassium permanganate, and dried by concentrated sulphuric acid or phosphorus pentoxide. Hydrogen is a colourless, odourless gas that condenses to a watery liquid at -253°C , and freezes at -259°C . It is the lightest known substance, a litre of the gas weighing but '09 gram, while the liquid has but '06 of the density of water. Hydrogen is very insoluble in water, and though not actively poisonous, is incapable of supporting respiration. Hydrogen burns in air with a non-luminous flame, exploding if previously mixed with the air, or oxygen, and in either case forming water by union with the oxygen. It likewise burns in chlorine, sulphur vapour, etc., but does not permit the combustion of tapers and similar bodies to take place in it. It acts as a powerful reducing agent, removing oxygen, chlorine, etc., from their compounds if heated with them, and also if nascent—*i.e.* if set free in contact with the body it is desired to reduce. Hydrogen unites with many elements to form compounds of very varied properties: thus it forms water with oxygen, hydrochloric acid with chlorine, and sodium and palladium hydrides with the respective metals. Palladium has a remarkable power of taking up large quantities of hydrogen in this way, and is sometimes used as a convenient method of storing or purifying small quantities of the gas. 'Hy-

drogen is present in all acids, and is a component of the hydrocarbons, which, with their derivatives, form so large a number of natural and artificial compounds. Hydrogen is used as a reducing agent, as a means of producing high temperatures in the oxy-hydrogen flame, and for filling balloons. It is also the standard to which gas density and several chemical relations are referred; though, owing to the uncertainty that up till recently existed as to the exact combining proportions between oxygen and hydrogen, it has been customary to make oxygen = 16 instead of hydrogen = 1 as the basis of the system of atomic weights—an arrangement that makes $H = 1.008$, instead of exactly unity. Hydrogen was first recognized as a distinct substance by Cavendish in 1766, though the formation of an inflammable gas by the action of acids on metals had been noticed earlier.

Hydrogen Peroxide, or DIOXIDE, H_2O_2 , is probably present in natural waters exposed to sun and air. It is obtained by the action of dilute sulphuric acid on hydrated barium peroxide, barium sulphate being precipitated, and the aqueous solution concentrated by evaporation on a water bath, followed by fractional distillation under reduced pressure. Hydrogen peroxide is a somewhat viscid liquid of faint blue colour that mixes with water in all proportions. It is unstable: it decomposes on keeping, or heating, into oxygen or water, the action being rapid and explosive if the pure liquid is heated, but is slow in solution, and greatly retarded by the presence of a trace of mineral acid. Hydrogen peroxide is a powerful oxidizing agent, displacing iodine, converting sulphides to sulphates, and bleaching by oxidation, etc. In some cases it appears to act in the opposite way, apparently reducing compounds like silver oxide to silver and chromic anhydride to chromium sesquioxide; but it may be, as evidenced in the latter case, that an unstable higher oxide is formed as an intermediate step. Hydrogen peroxide is used for delicate bleaching—as of ivory, feathers, hair, etc.—and probably has to do with 'sun bleaching.' It acts as a natural disinfectant—meat, milk, etc., not putrefying in sunlight from its formation; and it has recently been shown that it may be the cause of the rusting of iron.

Hydrography is the science of marine surveying, conducted for the purpose of making maps of navigable waters, and marking depths of the sea, currents, tides, rocks, and collecting all information for charts necessary to a navi-

gator. Hydrographical research is one of the most important functions of the navy in times of peace, and all ships are continually engaged in making observations and reports of the waters in which they find themselves. There are, moreover, ships specially detailed for the duty. For instance, in 1868 H.M.S. *Lightning*, and in 1869-70 H.M.S. *Porcupine*, conducted extensive operations in deep-sea sounding, and the *Challenger* in 1872-6 rendered splendid service to scientific progress. At the head of the hydrographical work of the navy is the hydrographer of the Admiralty. The office, as at present constituted, dates from 1795. The hydrographer is official adviser to the board upon all surveying matters. Under his supervision charts and nautical directions are published, as well as tide tables and light lists for all parts of the world. He is also adviser to the board concerning harbour conservancy and pilotage, and controls the scientific vote of the navy estimates for observatories, surveys, charts, and chronometers.

In the construction of charts the custom is to base them upon the true meridian—i.e. the east and west marginal lines are drawn parallel to the true meridian. Soundings are generally expressed in fathoms and fractions of a fathom. The velocity of tides is expressed in knots and fractions of a knot. The rise of tide is measured from the mean low-water level of ordinary springs. The range of tide is measured from the low water of one tide to the high water of the following tide. All heights are given in feet above high water ordinary springs, and, in places where there is no tide, above the level of the sea.

Hydrokinetics is that branch of the subject of hydrodynamics which deals specially with the motion of fluids under the action of force. Various types of fluid motion may be discriminated. The simplest of all is that of uniform steady motion. By uniform motion is meant motion which is the same in direction and magnitude at all points, so that the mass of fluid which is moving in this manner moves as if it were solid, and may be treated mathematically as such. No account is taken of the fact that a fluid may be regarded as a system of molecules, and we limit the discussion to an ideal fluid from which friction is entirely absent. Nevertheless, except in the cases of the more viscous fluids, the results correspond closely with actual facts; and the general nature of the deviations friction brings in can always be allowed for.

If, in addition to being uniform

throughout the mass, the motion is also steady, no change takes place in the motion of any part of the fluid at any time. For in steady motion, if we fix our attention on a particular point in space, the motion of the fluid at that point never alters from second to second, though it may be greatly different from point to point. Since in this case the motion is also supposed to be uniform, the velocity at all points is the same, and remains so from second to second.

The motion may, of course, be steady without being uniform. A specially important case of this kind occurs when the motion is constant in direction, and is uniform throughout any one of a set of parallel planes, while it varies in magnitude from one to another of these planes in strict proportion to their distance apart. Such motion is called *shearing motion*, and is closely exemplified in the slow motion of water in a wide canal, the parallel planes being all horizontal. In all such cases, in addition to considering the mere motion of any small portion of the fluid as a whole, we have to take account of the motion of its own different parts relatively to each other. This is completely determined when the change of form of the element is given as it passes from position to position. In this respect the problem becomes one of strain, with the additional idea of time involved.

Since all strains can be classified as rotational or non-rotational, we are thus led to distinguish two broad classes of fluid motion—*rotational* or *vortical* motion, and *non-rotational* motion. Each of these may be steady or unsteady; the latter alone can be uniform. When the motion is non-rotational, the mathematical investigation shows that the component of speed in any given direction can be expressed as the rate of variation, per unit of length measured in that direction, of a quantity which depends on the position chosen. When the motion is not steady the time is also involved in this quantity, which is called the velocity potential (compare the gravitational potential). It is found that, when a velocity potential exists—i.e. when the motion is non-vortical—the motion might have been produced from rest, or, on the other hand, the moving fluid might be brought to rest instantaneously by the application of a suitable system of impulsive forces.

The actual path of any one element of fluid is termed a *stream line*, or a line of motion. An envelope of lines of instantaneous motion is termed a *line of flow*. These coincide, and are perpendicular to the surfaces of equal

velocity potential, when the motion is non-rotational. As an illustration of the difference, consider the motion of points on a spoke of a carriage wheel rolling along level ground. Each point traces out a curve known as an epicycloid. This is the stream line—the actual path of the particle. The lines of flow, on the other hand, are circles whose centre is that point of the rim which is at the instant in contact with the ground.

To investigate any case of motion of a fluid, we have to form the fundamental equations of hydrodynamics. Consider the motion, in the positive direction of the x axis, of a very small cubical element of the fluid whose edges are parallel to the axes of co-ordinates. Let x be the component, in that direction, of the resultant force per unit of mass; and let a be the length of an edge of the little cube, while p is the pressure per unit area at the centre of the cube, and ρ is the density of the fluid. The cube is taken so small that x can be regarded as constant throughout the volume. A force $x\rho a^3$ acts outwards, along the x axis, on the mass ρa^3 . If v be the rate at which p varies per unit of length measured outwards along the

axis, a pressure $(p - \frac{ra}{2})a^2$ acts outwards on the face, perpendicular to the x axis, nearest the origin, and a pressure $(p + \frac{ra}{2})a^2$

acts inwards on the opposite face of the cube. Now, Newton's second law of motion tells us that the algebraic sum of the forces acting in any direction is equal to the product of the mass into the acceleration produced in that direction. Hence, if \ddot{x} be the acceleration in the positive direction of the x axis, we get

$$\rho a^3 \ddot{x} = x\rho a^3 + (p - \frac{ra}{2})a^2$$

$$- (p + \frac{ra}{2})a^2, \text{ and hence}$$

$$\ddot{x} = x - r/\rho.$$

Similarly we obtain two other equations expressing the conditions for the y and z directions. These three equations involve in general five unknown quantities—the pressure, the density, and the three components of speed. Hence two other conditions must be specified so as to make the problem definite. One of these is usually a relation connecting the pressure and the density. Thus, in the case of a gas which practically obeyed Boyle's law we should write $p = k\rho$, where k is a known constant. In the case of a practically incompressible fluid we should write $\rho = c$, where

c is a constant. The other condition expresses the fact that the rate at which the quantity of fluid contained in the little element increases is equal to the algebraic sum of the rates at which fluid enters the element across its six faces. This condition is generally called the 'equation of continuity.'

Some cases of motion can be solved very simply by consideration of the principles of conservation of energy and matter. Take the case of steady motion of an incompressible liquid. Imagine a small, closed curve through which some of the liquid is passing. Through each point of that curve draw a stream line. This forms a tube of flow, across the sides of which no liquid passes. Let p be the pressure of the fluid at one section of this tube at which the area of section is a , which is supposed to be so small that the speed v may be taken as constant at every point of it, and let ψ be the potential energy per unit mass at that section. Denote the corresponding quantities at another transverse section by the letters p' , a' , v' , and ψ' , and let the constant density be ρ . The excess of work which can be done per unit of time upon the fluid at one section, over that done by the fluid as it crosses the other section, is $pav - p'a'v'$, since pa and $p'a'$ represent the respective forces, while v and v' represent the distances moved per unit of time under these forces. And this, by the conservation of energy, must be equal to the gain of kinetic energy, together with the gain of potential energy per unit time. The former quantity is $\frac{1}{2}(\rho a'v')v'^2 - \frac{1}{2}(\rho av)v^2$, where $\rho a'v'$, ρav , represent the masses of fluid moving at the two places; the latter is $\rho a'v'v' - \rho avv$. And the principle of conservation of matter shows that the quantities of matter flowing across each section per unit time must be equal, since the fluid is incompressible. This gives $av = a'v'$. Hence

$$\frac{p}{\rho} + \frac{1}{2}v^2 + \psi = \frac{p'}{\rho} + \frac{1}{2}v'^2 + \psi' \\ = \text{constant}.$$

This condition is the basis of the common but obviously incomplete statement that in a fluid 'the speed is greatest where the pressure is least.' To modify it to suit the case of a compressible fluid, we have only to take account of the work done in compression or spent in expansion. It contains the explanation of many phenomena in fluid motion, such as the transverse motion of eddies gliding down a stream, etc. It applies to the motion of

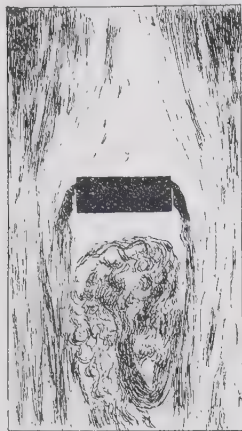
a fluid past a solid, and so, as Tait has shown, explains the action of spin on the flight of a golf ball. The constant in the equation above has, in general, different values along different stream lines. In uniform motion it would be absolutely constant.

To apply this result to water escaping from a small orifice in a vessel, take the first section at the upper surface of the liquid, which is practically at rest, and take the second at the opening. We have $p = p'$, because both surfaces are exposed to the atmosphere. Also $v = 0$, and $v - v' = gy$, where y is the depth of the opening below the upper surface, and g is the value of gravity. Hence $v^2 = 2gy$, and we see that the speed of escape is the same as that which would have been acquired by free fall, from rest at the level of the upper surface. Simple as this proof is, the result can be obtained more easily; for the only condition requisite is that, while the gain of kinetic energy per unit mass is $\frac{1}{2}v^2$, and the loss of potential energy gy , these quantities are equal.

In the case of vortical motion, it can be easily proved that the product of the area of section into the angular velocity of the fluid at that section is constant. Hence, as we do not contemplate the existence of infinite angular velocities in nature, we see that a vortex must be endless or have its ends on a free surface of the fluid. This was first proved by Von Helmholtz. Eddies or whirlpools are the ends of such vortices. The fact, already alluded to, that vortical motion cannot be produced or destroyed by impulsive forces, was made by Lord Kelvin the basis of his theory of vortex atoms, since it accounted for conservation of matter. When a fluid has a boundary, a further condition, called the 'boundary condition,' has to be introduced. This simply expresses the fact that the component of the speed of the fluid normal to the boundary is zero. The subjoined diagram is reproduced from a photograph by Professor Hele-Shaw. The vortices behind the dark obstacle are very evident; so also are the smooth, steady stream lines past and outside the edges of the obstacle.

Osborne Reynolds (*Nature*, May 22, 1884, and June 14, 1894) has shown how to determine stream lines experimentally by means of coloured filaments of fluid introduced slowly at required points, and Hele-Shaw (*Nature*, May 12, 1893, and Sept. 7, 1899) has shown how excessively small air bubbles may be similarly used.

The study of hydrokinetics to any extent requires a moderate knowledge of the differential calculus, and also of the integral calculus. Any one so equipped will find a very full discussion in Lamb's *Hydrodynamics* (1895), or a less extended treatment in Basset's *Elementary Treatise on Hydrodynamics and Sound* (2nd ed. 1900).



Liquid flowing past a flat plate.

Hydrolysis, the term applied to those chemical actions in which decomposition is brought about by the action of water. Such reactions are of many varieties—e.g. the splitting up of the salts of weak acids by solution in water, the conversion of esters into acid and alcohol, the 'inversion' of sugars, like cane-sugar, the formation of acid and ammonia from nitriles, etc. Mere addition of water is sufficient to cause hydrolysis in some cases, whilst heating with it, often under pressure, and usually with small quantities of acid or alkali, is necessary in others.

Hydromechanics, the science dealing with the application of liquids as motive power for machinery, whether depending on the statical principles exemplified in the hydraulic press, or on the laws of liquids in motion which govern the action of the turbine. Hydromechanics is usually taken to embrace so much of the purer sciences of hydrostatics and hydrodynamics as concern the principles of machinery, and is included in the wider term hydraulics.

Hydromel, a beverage, either fermented or unfermented, composed of honey and water. When fermented it is called mead, or vinous hydromel, to make which one part of honey is dissolved in three parts of boiling water—

spices, ground malt, and yeast being added.

Hydrometer, or **AREOMETER**, an apparatus for measuring, or more strictly comparing, the densities of liquids. There are various forms, but all are direct applications of the hydrostatic principle of Archimedes, which states that when a substance is wholly or partially immersed in a liquid, its apparent weight is diminished by the weight of the liquid which has been displaced. When the substance floats in the liquid, the weight of the amount of liquid displaced will be exactly equal to the weight of the body; hence more or less of the floating body will be immersed according as the liquid is lighter or heavier. In the great majority of cases the liquids under investigation do not differ much, as regards their density, from water. If the method indicated above is to be serviceable, the floating body or hydrometer must be made of such a form as to show very slight differences of density. The instrument consists of a glass bulb drawn out into a narrow tube above, and loaded below with sufficient quicksilver to keep it erect in the liquid with the bulb wholly immersed. The narrower the neck or tube as compared with the bulb, the more sensitive will the hydrometer be. A slight increase in the density of the supporting liquid will cause the hydrometer to float a little higher, and the length of neck projecting above the surface of the liquid will indicate the density of the liquid. In instruments of this type the neck is graduated, so as to show at a glance the exact density of the

care must be taken to have the surface of the neck perfectly clean and free from grease.

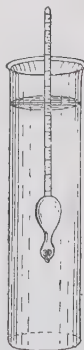
In laboratory work, however, in which accurate values of densities are required, it is not usual to make use of hydrometers. Pycnometers, or specific-gravity bottles, are capable of much greater accuracy.

A sensitive hydrometer is incapable of measuring densities through a great range; hence it is necessary to construct different forms for measuring cor-



Nicholson's Hydrometer.

respondingly different groups of liquids. Thus we have alcohol hydrometers, oil hydrometers, milk hydrometers, and so on, each graduated through a range suitable for the given group of liquids. An interesting form is that known as Nicholson's, or the hydrometer of constant immersion. It may be used not only for measuring densities of liquids heavier than water, but also for measuring the densities of solids. Its essential parts are a hollow brass cylinder, terminated above in a thin rod supporting a pan, and a pan attached to the lower end, which is also weighted so as to make the apparatus float upright. When immersed in water with a given weight m on the upper pan, the hydrometer sinks till a certain mark on the rod is flush with the water surface. When placed in a liquid of greater density, it will require a greater weight m_1 on the pan to make the hydrometer float at the same level—i.e. to make the hydrometer displace the same bulk of liquid. If w is the weight of the hydrometer without any added weights, then it is evident that the weights of the equal volumes of water and liquid displaced are $w + m$ and $w + m_1$ respectively. Hence the specific gravity of the liquid is the ratio of $w + m_1$ to $w + m$. Nicholson's hydrometer may also be used for measuring the specific gravities of solids which are not heavier than the weight m . It is for this use



Hydrometer.

liquid in which the hydrometer is floating. It is possible to construct hydrometers of this type which will measure the densities of solutions to four or five significant figures. When this degree of accuracy is aimed at, great

that the pan below is provided, so that the solid which is the object of experiment may be weighed in the water also. The method is to make two experiments. In the one the body is placed on the upper pan, and additional weights added until the hydrometer is brought to the marked level as before. The body is then placed in the lower pan, and weights again added to the upper pan until the same level is obtained. Knowing the original whole weight m , which sinks the hydrometer to the definite mark, and the weights required to do the same in the two experiments just described, we are able to find the weight of the body in air and in water, and thereby determine the specific gravity by the usual rule. See DENSITY and SPECIFIC GRAVITY.

Hydromys, a genus of Australian water-rats, peculiar to that continent and Tasmania and New Guinea. The single species (*H. chrysogaster*) is blackish above and golden below, and reaches a length of about two feet. The animal is purely aquatic in its habits, and is called beaver-rat by the colonists. It differs from other mice and rats in possessing only two pairs of molar teeth in each jaw. An allied terrestrial form, now placed in another genus, inhabits the same region. These forms are true rodents, and not marsupials like some of the other animals to which the name rat is applied by the colonists.

Hydrophathy. See HYDROTHERAPY.

Hydrophobia, or **RABIES**, is a disease communicated by a bite from a rabid animal. It is nearly always caused by the bite of a dog; but any animal, even man himself, may communicate it to another. The dog in Great Britain, the jackal in India, the pariah dog in Egypt, and the wolf in Russia are the animals from which hydrophobia is mostly derived. In Germany the disease is rare, because of the strict muzzling laws. From six weeks to two months usually elapse before the onset of symptoms, but the time may be shorter, or even longer. The early symptoms are dullness, depression, irritability, and general ill-health. Later there is a slight difficulty in swallowing, which becomes worse as the disease progresses, and hoarseness of the voice, or 'barking,' as it is fancifully termed, ensues. The temperature gradually rises to 101° or 103° F., and the symptom develops which has given the disease its name. Violent and painful spasms of the throat follow any attempt to swallow liquids, and the patient dreads such attempts. He also becomes

extraordinarily sensitive to sounds and vibrations. A draught of air or the sound of splashing water may throw him into convulsions. He may become delirious, and attempt to bite his attendants; but often his mind remains clear, and he is anxious to avoid any risk of danger to those about him. The disease ends in death from general exhaustion, or from heart-failure, or from asphyxia due to the spasms of the throat. In cases which have been diagnosed as hydrophobia, and which have recovered, there is reason to believe that the diagnosis was at fault.

Treatment must be as rapid as possible after a bite from any suspected animal. If the bite be in a limb, a tight ligature should be applied above the wound, to check the circulation of virus in the blood. The wound must be thoroughly washed with warm water to encourage bleeding, and it may be sucked, care being taken that the lips and mouth of the operator are thoroughly cleansed afterwards. The wound should be further treated by the application of carbolic acid or corrosive sublimate, in sufficient strength to destroy the tissues and the poison with which they have been inoculated. The same result may be attained by using a red-hot wire or nitrate of silver. In addition, the Pasteur treatment should be adopted as soon as it can be obtained.

Pasteur Treatment.—This is treatment by hypodermic injections of the attenuated or weakened poison of rabies. Pasteur found by experiment that an injected extract from the spinal cords of rabbits which had been inoculated with the virus was too weak to cause hydrophobia if the cords were kept dry for a certain time (about ten days). Further, he found that after injecting the extract from cords which had been dried ten days, he could safely inject newer, and therefore stronger, extracts, until at last he reached a strength of injection which under ordinary circumstances would produce hydrophobia. Then he discovered that the graduated doses give immunity from an inoculation that would otherwise be fatal. Patients who have been bitten by a rabid animal are now put through a graduated series of injections, and it is claimed that the mortality is greatly lessened by this treatment if only it is adopted in time. Under ordinary circumstances, 15 per cent. of those bitten by rabid dogs contract hydrophobia. Of these practically all die. Of those bitten by rabid wolves (mostly Russian) 40 per cent. are said to die. Of all those sent to the Pasteur Institute

for treatment, the deaths are under 1 per cent. The organism affects chiefly the upper part of the spinal cord and the medulla, and in these parts after death there are generally signs of severe inflammation and small hemorrhages. Wounds of the face or head are most likely to prove fatal, and the younger the patient the worse the prognosis. Mercury, curare, cold affusions, and sedatives have all been used during attacks, but little can be said in their favour, unless as palliatives. Spurious hydrophobia often occurs in nervous people who believe themselves in danger of the disease.

Hydroquinone, para-dihydroxy benzene, $C_6H_4(OH)_2$, is prepared by the oxidation of aniline to quinone by potassium bichromate and sulphuric acid, followed by reduction of the product by sulphurous acid and extraction with ether. Hydroquinone is a colourless, odourless crystalline solid (m.p. 169° C.), that has a slightly sweet taste. It is somewhat soluble in water, gives a green colour with ferric chloride, and acts as a reducing agent, being used for that purpose in photographic developers.

Hydrostatics is the science which treats of the application of forces to fluids in such a way that no motion ensues. Formerly the term was taken as applying only to liquids, and the application of forces to gases was considered under the term pneumatics or aerostatics, but this distinction is no longer observed. A fluid is a body which offers no permanent resistance to change of shape, or (which comes to the same thing) a fluid is a body which exerts, when at rest, a pressure at right angles to any surface with which it is in contact. Thus, since shoemakers' wax, left to itself under the influence of gravity, spreads itself over a flat table, and since putty, though soft, will not, the former is counted a liquid and the latter a solid. Taking the simplest case first, let us consider the hydrostatics of liquids. As a simplification it is customary to dismiss the action of capillary forces (see CAPILLARITY and SURFACE TENSION), which act only at the surfaces. Since by the definition of hydrostatics the liquid is at rest, we shall not alter the forces concerned by imagining any conveniently shaped portions of the liquid to become solid, but otherwise to remain unaltered. A cylinder of liquid thus solidified would be in equilibrium due to the pressures on its ends, the pressures on its curved surfaces, and its weight.

Consider the equilibrium of the cylinder in the direction of its length (Fig. 1). By the definition

of a liquid these pressures are normal to the surfaces concerned,



FIG. 1.

and the pressure on the curved surface will not balance any of the pressure on the ends. Thus, if there be any increased pressure on one end, there must be an equal increase on the other end, for the weight of the liquid will not alter. Hence we have the theorem, 'Any increase of pressure at one point of a liquid is at once transmitted to every other point.' This theorem is taken advantage of in the Bramah press, which consists essentially of a large and small cylinder, each fitted with a piston and filled with fluid, and connected together (Fig. 2). Let the large cylinder

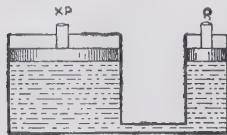


FIG. 2.

have a cross-section x times the smaller. Then if P pounds be put on the smaller piston, since the pressure transmitted is P on every area equal to the cross-section of the small cylinder, xP must be put on the large piston to keep it down. By making x very large an immense force is developed.

Again, consider a horizontal cylinder in a fluid. The pressures on the curved sides balance each other. The weight acts vertically, and therefore the pressures on the flat ends of the cylinder balance each other. Hence we have the theorem, 'The pressures at two points in the same horizontal plane are equal.' A particular case of this is the ordinary observation that 'water finds its own level.'

Let our cylinder now be vertical (Fig. 3). As before, the pressures on the curved sides will balance among themselves, and the pressure on the bottom will be balanced by the pressure on the top, together with the weight of the cylinder of liquid. Thus the difference of pressure between one part of a liquid and another point at a different level is equal to the weight of a column of liquid of unit cross-section, and of a height equal to the difference in level. This is very important, and a numerical example may make it

clearer. The density of mercury (its weight per unit volume) is 13.6 grams per cubic centimetre (or $\frac{1}{2}$ lb. per cubic inch); thus the pressure at the bottom of a column of mercury 10 centimetres high (or $2\frac{1}{2}$ inches) is 136 grams per square centimetre (or $1\frac{1}{2}$ lbs. per square inch). This theorem is applicable to most of the ordinary hydrostatic instruments—e.g. the barometer, the suction



FIG. 3.

pump, the siphon, and balancing columns. In the mercury barometer, for example, the column of mercury is kept balanced by the pressure of the air. When this increases or diminishes from any cause, the column gets longer or shorter. The action in the suction pump is similar to that in the barometer. When the piston is withdrawn, the pressure of the air forces water into the barrel (Fig. 4). The efficiency of the pump is thus limited by the pressure of the air, and water cannot in consequence be 'sucked' higher than about 33 feet.

The densities of liquids are frequently got by an application of this theorem. The heights of



FIG. 4.

two liquids that balance each other in a tube bent in the shape of a long U are noted. Since they balance, they have equal pres-

sures, and we know therefore that the height of the first multiplied by its density is equal to the height of the second multiplied by its density. If we know three of these quantities, the fourth can be calculated.

Further, from this theorem follows the 'principle of Archimedes,' which may be stated thus:—A body when immersed in a liquid is buoyed up by a pressure equal to the weight of liquid displaced by the body. Thus we may obtain the volume, and hence the density, of a body by weighing it in air and in water, and remembering that the weight of one cubic centimetre of water is one gram. An instrument depending on this principle is the hydrometer. See HYDROMETER.

The position of the metacentre in a ship can be obtained by a consideration of the principle of Archimedes. The pressure of the

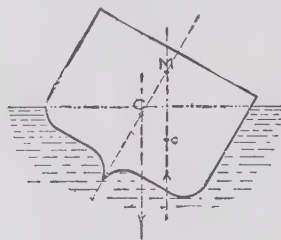


FIG. 5.

c , Centre of gravity of floating body; C , centre of gravity of displaced water; M , metacentre.

water on a ship acts in a line vertically through the centre of gravity of the displaced water (Fig. 5). This line meets the line drawn through the keel and the centre of gravity of the ship in the 'metacentre.' The ship will tend to right itself or capsize according as the metacentre is above or below its centre of gravity.

It is sometimes important to know the 'total pressure' of a liquid on a body with which it is in contact. This is got by dividing the area of the body into many very small parts, multiplying the pressure on each small part by that part, and taking the sum. Of course, if the pressure be constant (as on the bottom of a vessel), the total pressure is got by multiplying the area by the pressure. The 'centre of pressure' is the point on the surface at which the resultant pressure may be taken as acting, so that it would have the same effect as all the pressures taken together. The total pressure on a vertical lock gate of height h feet and breadth

b feet is $hb \times \frac{h \times 62.5}{2}$ lbs., and

the centre of pressure is in this case $\frac{2}{3}h$ feet below the surface.

A gas differs from a liquid in the lesser cohesion of its particles. From the present point of view the chief differences are these: firstly, a gas is very compressible, whereas a liquid is nearly incompressible; and secondly, a gas has comparatively little weight.

Hence, while the above theorems apply to gases, they are not relatively so important as the two laws of Boyle and Charles giving the relation between the volumes, pressures, and temperatures of gases. (See GASES AND VAPOUR.) Boyle's law becomes practically important, for example, in the case of the diving-bell (Fig. 6). Now, if the surface of the water inside this apparatus be x feet below the level of the surface outside, this means that the

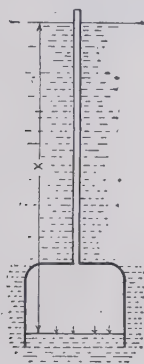


FIG. 6.

pressure on the air in the bell is greater than the pressure of the outside air by the pressure of a column of water x feet high. Thus the pressure of the air inside is approximately $\frac{x+33}{33}$

atmospheres, 33 feet being the approximate height of the water barometer. Though gases have little weight, this is not negligible, as may be seen in the case of the atmosphere. Its pressure is due to its weight. On going up a hill, therefore, we find that the barometer falls. The fall near sea-level is approximately one inch for every thousand feet; but at higher altitudes the rate is lower, owing to the diminished density of the air. We can thus estimate the height of a hill by the fall of the barometer. For amplification of the above, see Greaves's *Hydrostatics* (1894); and for work involving the calculus, Besant's *Hydrostatics* (6th ed. 1904).

Hydrotherapy, in medicine, is treatment of disease by water, whether externally or internally applied. The cure of disease by water was known to the ancient

Greek, Roman, and Arabian physicians. Hippocrates wrote a treatise thereon. French and German physicians have paid considerable attention to the matter, and in the United States of America a great deal of strictly scientific work has lately been done in connection with hydrotherapeutics. In Great Britain it is probably more used now than ever before by legally qualified medical men.

For therapeutic purposes water may be applied externally by means of baths, douches, sprays, wet packs, and fomentations, while internally it may be administered by the mouth, or used for the lavage of various cavities. When water falls from a height upon the body, as in the shower-bath, or is directed forcibly against it under pressure, as in the needle-spray, it stimulates the sensory nerves of the skin mechanically by its weight apart from its temperature. Properly taken (i.e. rapidly), the cold bath causes an immediate stimulation of the skin and of the nervous system. The first noticeable effect is a deep inspiration or gasp, followed by fuller breathing for some time after. The capillaries of the skin contract, and the blood is consequently driven quickly to the deeper parts. Then follows a reaction. The cutaneous vessels dilate to a greater calibre than before the shock, and blood rushes freely to the surface, causing a glow of heat, with flushing of the skin, if the body be healthy enough to respond and react properly to the stimulus. This ebb and flow of the blood means a strong impulse to the general circulation. The heart's action is strengthened, the blood courses more rapidly everywhere, and the nervous system is braced.

If cold be too great or too prolonged there is no reaction, and the result is altogether lowering to vitality. In treatment by cold packs, for example, wet sheets, dripping or wrung fairly dry, according to circumstances, are at times used to lower an abnormally high temperature.

A wet sheet applied for a few minutes, especially if the patient be rubbed at the same time, causes a reaction which dilates the skin capillaries and leaves the body in a glow; but a wet sheet covered by a blanket soon becomes a modified vapour-bath, which causes continued dilatation of the capillaries and promotes sweating. Such a bath, unless taken immediately before bedtime, should always be followed by a cold spray or plunge, the reaction from which tones up the dilated vessels, and so

prevents subsequent chill. In enteric fever the death-rate has undoubtedly diminished under treatment by baths, adapted in temperature and duration to the degree of pyrexia and the general condition of the patient; and scarlet fever and pneumonia are reported to take a much less severe course under careful bathing and packing. Sciatica is often relieved by the damp heat of a warm compress, and insomnia in many cases yields to either a hot or a cold bath, as the result of dilatation of the superficial blood-vessels, which are capable of holding 60 per cent. of all the blood in the body.

For some skin diseases, and for the prevention or cure of sepsis in wounds, the injured parts, and sometimes the whole body, have been kept in water for many weeks without cessation, the inflow and outflow of water being so regulated that it is always clean, and (necessarily for a long exposure) always of a comfortable temperature.

Internally water is of great service in soothing, cleansing, or cooling the surfaces of the different cavities of the body. Water taken hot or cold into an empty stomach washes it, and passing on to the intestines, cleanses them, and promotes peristalsis. Part of it is absorbed into the blood and excreted by the skin and kidneys, which are also washed in this way and kept in good working order. Water is also now frequently administered through a stomach-tube and siphoned off again, in order to rid the stomach of irritating and possibly decomposing residues of food, in cases of chronic catarrhal gastritis. Constipation, diarrhoea, and piles are often much relieved by rectal injections of water. Injections of hot water into the rectum or womb are also of service in arresting hæmorrhages; while irrigation of the bladder frequently prevents or cures a septic condition of the urine. Cold douches and vapour-baths also tend to reduce obesity by increasing tissue metabolism.

Priessnitz, who administered (1820-41) cold douches to his patients through the medium of a mountain stream, may be said to have been the modern pioneer in hydrotherapy.

Hydroxylamine, NH_2OH , is obtained by the action of nascent hydrogen, from tin and hydrochloric acid, on ethyl nitrate or nitric oxide. It is difficult to obtain pure, and is a white solid that explodes when heated. Hydroxylamine dissolves in water, is a powerful reducing agent, and has basic properties, forming salts by union with acids.

Hydrozoa, a class of the phylum or series Coelentera which includes the simplest forms of the series. The mesenteries or partitions which divide the general cavity of sea-anemones are here absent, and the mouth leads directly into this cavity without the intervention of a gullet. The reproductive cells at least usually rise from the ectoderm. A typical form is one of the sea-firs—*e.g.* *Obelia geniculata*, which covers seaweed, etc., on the shore with its slender branching stems. The sea-fir shows a simple and regular form of alternation of generations, the alternating types of structure being the polype and the medusoid. In the class Hydrozoa are included not only numerous kinds of sea-firs, but certain fixed forms which possess the power of forming corals, and which show much division of labour among the members of the colony (Hydrocorallinae); other forms which have no polype stage, but are permanently medusoid (Trachymedusae); and finally the Siphonophora, which are floating colonies, again showing much division of labour: these are exemplified by the Portuguese man-of-war.

Hydrus, a south polar constellation added by Bayer in 1603.

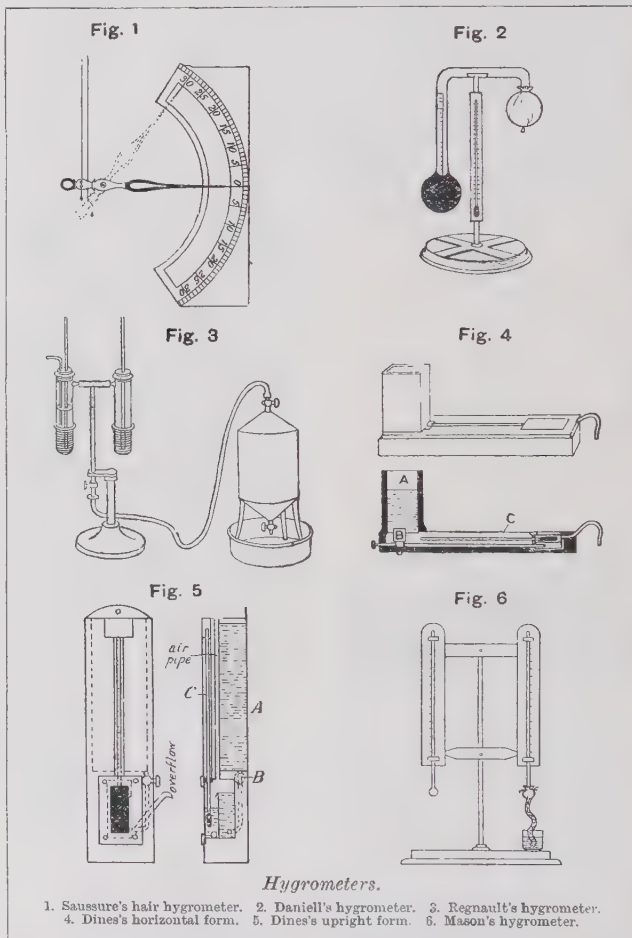
Hyères, or **HIÈRES**, favourite winter health resort, dep. Var, France, on the Riviera, 11 m. E. of Toulon, and 3 m. from the sea. The climate is mild and dry, though the mistral is sometimes disagreeable. The plain of Hyères is a veritable field of roses. Palm and orange groves add much to the beauty of the town. The Hyères roadstead (60 m. square) is protected by the Îles d'Hyères. The salt pans yield 20,000 tons a year. Pop. (1901) 17,659.

Hygieia, in ancient Greek mythology the goddess of health, was the daughter of Asclepius, and was usually worshipped along with her father. She is represented as a maiden dressed in a long robe, with an aspect of mild beneficence.

Hygiene, or the science of health in its widest aspect. This science embraces laws of personal health—rules for diet, for hours of recreation and work, of exercise and rest, for cleanliness of mind, body, and dwelling-place, and for the sweetening of life by pure water, fresh air, and sunlight. Horace's ideal of *mens sana in corpore sano* (a healthy mind in a healthy body) is what it aims at. See further under PUBLIC HEALTH, SANITATION, DIET, VENTILATION, etc.; and Caldwell's *Military Hygiene* (1905), Smith's *Manual of Vet. Hygiene* (3rd ed. 1905).

Hygrometer, an instrument for measuring the humidity of the air. The rude instrument invented by Coniers, and described in the *Philosophical Transactions* of 1676, appears to be the first specimen of such an instrument as the hygrometer. Hygrometers are of three kinds—those, namely, of absorption, of condensation, and of evaporation. Instruments of the first

passed round a wheel carrying a long arm, which moves over a graduated arc that multiplies the indications. The hair is kept taut by a counterpoise weight; its contraction or expansion is consequent upon its absorbing or yielding moisture. In Richard's hygrograph, or self-resisting hygrometer, this principle is taken advantage of to yield a continuous record of the hygrometric



class are made of various fibrous organic substances, such as hair, oatbeard, catgut, seaweed, etc., which change their minute structure or appearance with variations in the humidity of the air. Saussure's hair hygrometer, which is fairly representative of this class, consists of a brass frame, to which a hair is fastened at one end with an adjustable screw, and at the other is

variations, on a rotating cylinder actuated by a clock movement. Hygrometers of condensation experimentally illustrate the principle of the dew-point (see DEW); of these, three call for explanation—*viz.* Daniell's, Regnault's, and Dines's. Professor Daniell invented in 1820 the instrument which bears his name. It consists (see Fig. 1) of a glass tube bent at right angles at two

points, with a bulb at each extremity. One of the bulbs, which is of blackened glass, is nearly filled with ether, in which is immersed the bulb of a delicate thermometer; the other bulb is covered with thin muslin. Ether being poured gently over this muslin, evaporation takes place, which rapidly cools the bulb, and thus condenses the vapour of the ether within. In consequence of this the ether inside the other bulb evaporates, so that its temperature is reduced, causing a ring of dew to be formed on the exterior of the black-glass bulb. At this instant the thermometer inside is read off, as this reading gives the dew-point of the air at the time, while the temperature of the air is obtained from the thermometer attached to the pedestal of the instrument. Regnault's hygrometer (Fig. 2) is a modification of Daniell's, and consists of two very delicate thermometers, the bulbs of which pass through collars nearly to the bottom of two thin and highly-polished silver cylinders. Close to the bottom of these cylinders two tubes, which subsequently unite, pass to an aspirator. Sufficient ether to immerse completely the bulb of the thermometer is supplied to one of the silver cylinders. The aspirator being filled with water and the tap at its base turned, air is drawn past the thermometer bulbs and through the two cylinders. When it passes, however, through the one partly filled with ether, rapid evaporation is produced, causing a fall of temperature; and when the cylinder is dimmed by the deposition of dew, that thermometer shows the dew-point temperature, and the other one the temperature of the air. In Dines's direct hygrometer (Figs. 3 and 4) a vase A, fitted with a pipe at the bottom, is conducted close under a plate of black glass, where it envelops the bulb of a thermometer C, a cock B being fitted to the vase at the base. A little water and ice, or cold water only, is put into the vase and allowed to flow gently through a small chamber by turning the tap B; whereupon the glass rapidly becomes dulled, and the thermometer is read. The tap is then closed again; the water in the tube soon rises in temperature, and the cloudy condensation vanishes, the moment of its disappearance being that when the dew-point is again reached. An improved form of this instrument has been designed for use with ether, the dew-point being ascertained in the same way as by Regnault's hygrometer (see *Quart. Jour. Roy. Met. Soc.*, vol. vi. p. 39).

The hygrometer in most general use is the hygrometer of evaporation, otherwise known as the 'wet and dry bulb thermometer,' or 'Mason's hygrometer.' As far back as 1792, Hutton observed that a thermometer read lower if its bulb was moistened, but the practical application of this knowledge to hygrometry we owe to Sir John Leslie of Edinburgh and to Mason of London. Mason's hygrometer (Fig. 5) consists of two carefully graduated thermometers placed side by side. One of these thermometers gives the temperature of the air, and is known as the 'dry bulb.' The other thermometer has a wrapping of thin muslin on its bulb, which is kept moistened with water, drawn from a small reservoir by means of capillary attraction through a few strands of loosely twisted lamp wick. Water evaporating from the muslin cools the bulb, the temperature of which is depressed in proportion to the amount and rapidity of evaporation. If the air is saturated, there is no evaporation, so that the two thermometers indicate the same temperature; but if the air is very dry, the wet-bulb thermometer will indicate a temperature lower than that of the air by several degrees—the difference being greater as the air is drier. From a knowledge of the two temperatures—the 'wet' and the 'dry'—and of the thermal constants of the thermometers, we can estimate the humidity of the air. Practically, however, this is done by *Hygrometric Tables*, the best known being those prepared by Glaisher (8th ed. 1893). See G. J. Symons's 'A Contribution to the History of Hygrometers,' in *Quart. Jour. Roy. Met. Soc.* (vol. vii. p. 161); W. W. Midgley's 'Constructive Errors in Some Hygrometers,' in *Quart. Jour. Roy. Met. Soc.* (vol. xix. p. 197); C. Piazza Smythe's 'The Wet Bulb Hygrometer—its Use and Efficiency,' in *Jour. Scot. Met. Soc.* (vol. vii. p. 267); 'Notice of a Peculiarly Effective Hygrometer Fifty Years Old,' by the same, in *Jour. Scot. Met. Soc.* (vol. viii. p. 220).

Hylas, in Greek legend, was a beautiful youth, the friend of Hercules, whom he accompanied on the Argonautic expedition; but on the Mysian coast the Naiads drew him down into the depths of the spring.

Hyllus, in Greek legend, was the son of Hercules by Deianeira. After his father's death he was excluded from the Peloponnesus by Eurystheus, and took refuge at Athens. Later on he was killed by Echemus, king of Arcadia, when trying to force his way into the Peloponnesus.

Hymen, in Greek, the song sung at wedding celebrations; afterwards the god of marriage, who is usually represented as the son of Apollo and a muse.

Hymenoptera, an order of insects including ant, bee, and wasp. The distinguishing characters are that there are four membranous wings, usually transparent and of unequal size, the anterior being the larger; that the mandibles are always conspicuous, though the other parts of the mouth may be converted into a suctorial proboscis; that the females are furnished with a saw, sting, or ovipositor at the end of the abdomen; that the metamorphosis is complete, the larva being more or less maggot-like. There is a singularly perfect joint between thorax and abdomen, or rather between alitrunk and abdomen; for the apparent thorax has fused with it an abdominal segment, and therefore does not correspond to the thorax in other insects. In some cases the segment of the abdomen next to the joint is greatly narrowed, and so forms a 'waist' between the two regions of the body, as occurs in all the higher forms. The wings are beautifully locked together by hooks, so that in flight they act as one organ.

The Hymenoptera may be divided into two suborders—(1) *Seasiliventre*s and (2) *Petiolata*, according as the 'waist' is absent or present. In the first suborder are included the various kinds of sawflies; in the latter gall-flies, ichneumon flies, bees, wasps, and ants, all of which are discussed under separate headings.

Hyemettus, mt. in Attica, ancient Greece, 3,370 ft. in height, about 5 m. S.E. of Athens; famous for its honey and its marble.

Hymn. St. Paul (Eph. 5:19; Col. 3:16) distinguishes between 'psalms' (i.e. songs, such as the Psalter, with musical accompaniment) and 'hymns,' adding, as a third variety, probably less restricted in point of theme, 'spiritual songs.' A well-known letter of the younger Pliny (Ep. 97) to Trajan testifies to the use of hymns in Christian services at the beginning of the 2nd century. The custom, like Christianity itself, travelled westwards, and so did the very words.

LATIN HYMNODY. (1.) *To the end of the 10th century.*—St. Augustine's definition of a hymn (*Comm. on Ps. 148*), 'a song with praise of God,' needs, as will be seen later, some expansion. The earliest names connected with any Latin hymn are Niceta, missionary bishop in Dacia (c. 400), 'Te Deum,' and St. Hilary, bishop of Poitiers (d. 368). St.

Ambrose, bishop of Milan (d. 397) is the real founder of the great school of Latin hymnody which flourished in the Western Church. Here hymns were introduced, as in the East by St. Chrysostom, by way of an antidote to heresy. There was a gradual substitution of accent for quantity, owing perhaps in part to the decay of the classical method of pronunciation, combined with the aim of making the singing in the fullest sense congregational. Classical metres were excluded, except a modified form of iambic and trochaic. St. Benedict of Nursia (d. c. 541), by the fitting of hymns on to his Order of Worship, secured their widespread and permanent hold. In the daily and weekly worship, as well as at fasts and festivals, these formed the substance of early English Church hymnody down to the middle of the 16th century. Prominent names in connection with hymns of this period are Venantius Fortunatus, an Italian poet, bishop of Poitiers (d. 609), 'The royal banners forward go,' Charles the Great (d. 814), to whom (or with more probability to his grandson, Charles the Bald, d. 875) is attributed 'Come, Holy Ghost, our souls inspire,' Theodulphus (d. c. 821), 'All glory, laud, and honour.' To this period also belong 'Blessed city, heavenly Salem,' and 'Christ is made the sure foundation.' The general characteristics of the period are the praise of God, and emphasizing of the facts of redemption and exhortation.

(2) *11th to 16th century.*—Hymns of this period are mainly monastic in origin, and are marked by subjectivity and mysticism. They deal largely with the lives and sufferings of saints, and specially with the growing cult of the mother of our Lord. 'Assonances,' passing gradually into rhyme, are characteristic of their form. The hymn by St. Bernard of Clugny (12th century), 'The times are very evil' (trans. by Neale), is one of the best. The famous 'sequences,' 'Dies Iræ' and 'Stabat Mater,' are probably somewhat later. Sentimentalism is the prominent note, especially in the vast number of hymns which were addressed to the Virgin and the saints.

ENGLISH CHURCH HYMNODY.—The pre-reformation hymns in the vernacular seem to have been but few—e.g. that used by Bede on his deathbed. In the Book of Common Prayer the only survival included in the Latin Offices from which it was compiled is the 'Veni, Creator' (Ordinal), and this although books of private devotion admitted them freely. In public their place was

taken by the Psalms (see PSALMS). These, with the addition of Paraphrases from Scripture, held their ground for purposes of congregational music till the end of the 17th century, in the course of which original English hymns may almost be said to have had their birth. We can trace their growth out of the Paraphrases in the gradually increasing freedom with which passages were grouped in framing the latter. Thus it has been truly said that the real cradle of English hymns is the English Bible—an origin still stamped upon their general features. In this way the historical interest of the Paraphrases is considerable, even for those religious bodies which no longer use them. Prominent writers of this period (we omit Milton, whose 'hymns' are not for congregational use) are George Herbert (1593-1633), 'The Sundays of man's life,' who links music of words to beauty of thought; George Wither (1588-1667), whose *Hymns and Songs of the Church* (1623) is the earliest attempt at an English hymn book. It contains hymns for all seasons, as well as hymns adapted to work of the most ordinary character—e.g. 'when sheep-shearing,' 'when washing.' But for the counteracting influence of Puritanism, these might have led to a speedy outpouring of hymnody. The Conventicle Act, however (1664), was in itself a strong discouragement to any uplifting of the voice on the part of nonconformists in their secret meetings for worship. Bishop Ken's three hymns ('Awake, my soul, and with the sun,' 'All praise [glory] to Thee, my God, this night,' 'All praise to Thee, in light arrayed') for morning, evening, and midnight, intended apparently for the use of Winchester scholars, and written not later than 1674, are conspicuous for the intensity of their devotional spirit. Among his numerous poetical works, distinguished often by a perversity of taste, are hymns for the festivals, said to have suggested to Keble his *Christian Year*. John Mason (?1646-94) wrote long spiritual songs, which, owing to the inequality in merit of different stanzas in the same piece, appear best in the form of centos.

18th century.—From the close of the 17th century hymns, if not hymn writers, are numerous. In the Church of England, however, apart from John and Charles Wesley (see below, but note that Charles never ceased to be a member of the Church of England), the period was a somewhat barren one till Toplady (1740-78) contributed the noble hymn 'Rock of Ages,' while the educated taste of William Cowper (1731-

1800) and the spiritual fervour of John Newton (1725-1807) furnished in the *Olney Hymns* (1779) much material of permanent value, though bearing traces of a narrow school of theology. Cowper's are more characterized by a plaintive tenderness ('Hark, my soul, it is the Lord,' 'There is a fountain filled with blood'); Newton's (though not deficient in the same quality—e.g. 'How sweet the name of Jesus sounds') by manly strength ('Glorious things of thee are spoken').

19th century.—After some controversy as to the legality of hymn-singing in churches—a difficulty overcome in some cases (e.g. by Cotterill in 1820) by the dedication of the book to a bishop—we find that the thirty or forty years terminating with 1850 were conspicuous for compilations—e.g. *Christian Psalmody*, by Edward Bickersteth, in 1833; superseded by the *Hymnal Companion* (1870-6), by his son, E. H. Bickersteth. Conspicuous hymns of this date are Bishop Heber's 'From Greenland's icy mountains' (1812), 'The Son of God goes forth to war,' and his Trinity hymn, 'Holy, holy, holy, Lord God Almighty,' which stands in the front rank of hymns of adoration. This and his coadjutor Dean Milman's 'Ride on' illustrate the provision, till then largely neglected in the Church of England, of hymns for notable occasions in the church's year. In the encouragement of this feature later, as well as in raising the poetic standard of hymns, Keble has a large share. Newman, Mant, and others before the middle of the 19th century, by the attention they bestowed on Latin hymns, did much to mould the collections that followed. The *Hymnal Noted* (1862) of J. M. Neale almost entirely ignores English hymns, while showing his marvellous skill in adapting the Latin to English purposes. In this way hymns of nonconformist parentage, hitherto forming two-thirds of the contents of Church of England hymn books, gave place in many cases to versions of Latin and, to a less extent, of German origin. Out of the numerous collections of hymns, original and translated, made subsequently to Neale, the following are the most popular: *Hymns Ancient and Modern* (1861 and onwards), the very title of which, even apart from the care and width of view shown in the selection itself, secured speedy and lasting popularity in England; *Church Hymns* (1871 and onwards, S.P.C.K., superseding their *Hymns*, 1852, and *Psalms and Hymns*, 1855), richer in poetic language; the *Hymnary* (1870 and onwards), High Angli-

can, containing more translations from the Latin than any of the others, compared with which it is somewhat cold; the *Hymnal Companion* (E. H. Bickersteth, 1870 and onwards), with purer texts, but drawing very little from non-English stores. Its doctrinal position is that of moderate churchmanship, while providing abundantly for the various developments of church work. It is decidedly more subjective and individual in its tone than the others mentioned, in this way corresponding to the general character of the hymns written by the compiler—e.g. 'Peace, perfect peace,' and 'Stand, soldier of the Cross.'

Hymn-writers in this period are legion. The following are among the best known:—H. Kirke White (1785-1806), 'Much [Of] in sorrow, oft in woe.'—Sir R. Grant (1779-1838), 'O worship the King,' 'Saviour, when in dust to Thee.'—H. F. Lyte (1793-1847), 'Abide with me,' 'Pleasant are Thy courts above.'—J. Montgomery (1771-1854). He may be called the first real English hymnologist. His *Christian Psalmist* (1825) was at once historical and critical of the vices and defects found in many existing hymns. He was the first to set forth the canon that a hymn should be symmetrical, well balanced, and finished off, with a unity of theme. 'Hail to the Lord's Anointed,' 'For ever with the Lord.'—D. Sedgwick (1814-79) has been termed the father of English hymnology. Of scanty education, he nevertheless amassed an invaluable collection from every quarter, and his wide knowledge was frequently laid under contribution. See remarks of Sir R. Palmer (Lord Selborne) in the *Book of Praise*.—Bishop Christopher Wordsworth (1807-85), 'Hark, the sound of holy voices,' 'O day of rest and gladness.' Owing to his love of mystical interpretations of Scripture, his compositions remind us of Greek hymns. 'O Lord of heaven and earth and sea' is typical of his style, marked by fervency and sincerity rather than by poetic gifts of a high order.—J. M. Neale (1818-66), conspicuous not only as a successful translator from Greek and Latin sources (see above), but also as a writer of children's hymns: 'Christian, dost thou see them?' 'Art thou weary?' (Gr.) 'Fierce was the wild billow' (Lat.) 'Jerusalem the golden,' 'Christ is made the sure Foundation' (Lat.), and 'Of the Father's love begotten' (Lat.).—H. Bonar (1808-89), 'I heard the voice of Jesus say,' 'A few more years shall roll.' Through the power exercised by his hymns of faith and hope the use of the old

national metrical Psalms and Paraphrases in Scotland has been well-nigh superseded.—J. Ellerton (d. 1893), full of exquisite feeling for nature, especially in her graver aspects. His hymns are simple, clear, and stately in their rhythm. 'Saviour, again in Thy dear name we meet,' 'Sing Hallelujah forth in duteous praise,' 'Now the labourer's task is o'er' (the first really good English funeral hymn).—Much the same terms may be applied to the style of Bishop W. W. How (1823-97), co-editor with him of *Church Hymns*. 'O Jesu, Thou art standing,' 'For all the saints who from their labours rest,' 'This day at Thy creating word.'—T. B. Pollock (d. 1896), very successful as a writer of metrical litanies—e.g. 'God the Father, throned on high,' 'Jesu, with Thy Church abide.'—S. J. Stone (d. 1900), 'The Church's one foundation,' 'Weary of earth.'—H. Twells (1900), 'At even, ere the sun was set.'—Rev. S. Baring-Gould is a well-known contributor to hymnology: 'On the resurrection morning,' 'Through the night of doubt and sorrow,' 'Onward! Christian soldiers.'—Of women writers in the same century we may name the following:—Charlotte Elliott (1789-1871), 'Just as I am' (said to have been translated into more languages than any other hymn), 'My God, my Father, while I stray,' 'Christian, seek not yet repose.'—Catharine Winkworth (1827-78). To her translations may be in the main attributed the modern popularity of German hymns.—F. R. Havergal (1836-79), 'Take my life, and let it be,' 'Lord, speak to me, that I may speak,' 'Thy life was given for me.' For intensity of devotion to Christ it is interesting to compare and contrast her hymns with those of Anne Steele (Baptist; 1717-78), the latter dwelling on the sufferings of her Lord, the former on His present claims as Master and King, and on personal service to Him in Christian work.—Mrs. Alexander (to be credited to Irish hymnody, 1818-95). The gentler views of our day as to a child's relation to God are conspicuous in her hymns for little children, as compared with those of earlier time. For beauty and fitness of expression these compositions of hers are unequalled: 'Once in royal David's city,' 'There is a green hill far away,' 'Do no sinful action.'

NONCONFORMIST HYMNODY. (1.) *Roman Catholics*.—If we except 'Jerusalem, my happy home,' by an unknown author of the 16th or 17th century, Roman Catholic contributions to hymnody were few till comparatively lately. Cardinal Newman (1801-90)

chiefly, though not exclusively, as a translator, and F. W. Faber (1814-63) as an original composer, merit notice. Favourite hymns by the former are 'Lead, kindly Light,' and (from his *Dream of Gerontius*) 'Praise to the Holiest in the height;' while some of Faber's hymns, though many are open to criticism (see below), are well adapted to mission services. Mr. Orby Shipley's *Annus Sanctus* (1884), with appendix, is a collection of great value.

(2.) *Baptists*.—Unlike the Congregationalists (see below), this body long objected to all singing in public worship. We may mention J. Stennett (1663-1713), their earliest hymn-writer, and his grandson, S. Stennett (1728-95). For Anne Steele, see above. A later conspicuous writer was Baptist W. Noel (1798-1873).

(3.) *Congregationalists*.—Their greatest names are I. Watts (1674-1748), P. Doddridge (1702-51), and J. Conder (1789-1855). Of these Watts is only equalled by C. Wesley in popularity with compilers of hymnals, from the power of faith and love shown in his best efforts. Among the most popular of his hymns are 'O God, our help in ages past,' 'Jesus shall reign,' 'When I survey the wondrous Cross.' He was a pioneer in the attempt to write children's hymns. Among the best known of Doddridge's hymns are 'Hark, the glad sound,' 'My God, and is Thy table spread?' 'Ye servants of the Lord.' He had, on the whole, better taste than Watts, but less fervour. None of his are so good as Watts's best. Favourites among Conder's hymns are 'Bread of heaven, on Thee I [we] feed,' 'The Lord is King, lift up thy [your] voice,' and of Edmeston's 'Lead us, heavenly Father, lead us,' 'Saviour, breathe an evening blessing.' Since 1836 (the date of Conder's *Congregational Hymn Book*) many collections have been published—e.g. the *Leeds Hymn Book*, where the width of choice as regards sources (English, German, and unreformed) gave the hymnody of this body a new literary character. The *English Hymn Book*, by R. W. Dale (1874), contains in the main only those hymns which the editor considered to be in harmony with the characteristic type of English piety, thus excluding nearly all of the middle ages and of German Protestantism.

(4.) *Methodists*.—Methodism from the first saw the importance of singing in public worship. The mission work of John Wesley (1703-1791) in Georgia was a turning-point in the history of English hymnody. He obtained from the Moravians the text of many German hymns. His col-

lection of 1737 was the first published for use in the Church of England. He also translated from the French and Spanish. His younger brother Charles (1707-88) was one of the most prolific hymn-writers of any period. There are ascribed to him no less than 6,500, necessarily of very various degrees of merit. They relate to almost every occasion of importance, public or private—'Christ, whose glory fills the skies,' 'Hark, how all the welkin rings [the herald angels sing], 'The strife is o'er, the battle done,' 'Jesus, Lover of my soul,' 'Soldiers of Christ, arise,' 'The saints on earth, and those above,' Hymns by subsequent Methodist writers are but few. See Champness's *Half-Hours with the Methodist Hymn Book* (1905).

(5.) *Presbyterians*.—See Scottish Hymnody below. The only hymn-writer of much note connected with the Presbyterian Church in England is J. D. Burns (1823-64), 'Hushed was the evening hymn.'

WELSH HYMNODY.—Simplicity and transparency are characteristics of Welsh poetry, which has been compared to Hebrew in this respect. Conspicuous names are mostly post-reformation.—Archdeacon Prys (?1541-1624) recast the Psalms in a popular metrical version (1621).—Vicar Pritchard (1644). His quaintly-phrased *Welshman's Candle* served as a hymn book.—William Williams of Pantycelyn (1717-91) is the 'sweet singer' of Wales, devout and even rapturous, while deep and mature in thought. 'Guide me [us], O Thou great Jehovah,' 'O'er the gloomy hills of darkness.'

SCOTTISH HYMNODY.—The singing of hymns other than the Paraphrases dates from the latter half of the 19th century. The *Free Church Hymn Book* (1882) owes much of its excellence to Professor A. B. Bruce. The *Evangelical Union Hymn Book* may be noted as containing the almost unique feature of a list of original readings, where the text has been altered. In the Established Church the *Scottish Hymnal* (sanctioned 1884) is the outcome of several careful revisions. In 1898 the *Church Hymnary* was adopted by the Church of Scotland, the Free Church of Scotland, the United Presbyterian Church, and the Presbyterian Church of Ireland. Sir John Stainer was musical editor.

IRISH HYMNODY.—The *Book of Hymns of the Ancient Church of Ireland*, J. H. Todd (1805-69), contains the fullest account of old Irish hymnody. In later days Tate and Brady's *Metrical Psalter* was succeeded (c. 1820) by

the *Melodia Sacra* of Dr. Weyman, sometime vicar-choral of St. Patrick's Cathedral, Dublin; which, however, retained a few selections from the Psalms. For Mrs. Alexander's hymns, see above. T. Kelly (d. 1854), son of an Irish judge, was a successful hymn-writer. In 1873 the *Church Hymnal* (A.P.C.K., Dublin, 1864) was revised, enlarged, and authorized as the hymn book of the Church of Ireland, and has since been furnished with an appendix. It is an admirable collection, with an excellent biographical index.

The following principles may be laid down for testing and differentiating hymns in point of merit:—(1.) A hymn should be 'a song of praise to God' (see St. Augustine above). The praise, however, may be sometimes implied rather than expressed. 'Sun of my soul,' for example, consists mostly of words of prayer, but of prayer which, as emphasizing throughout the Saviour's compassion and love, is of the nature of praise. On the other hand, a didactic style is to be avoided. (2.) A hymn, if intended for public worship, should not involve expressions of private devotion or special personal experiences of a kind unsuitable for the lips of a general congregation—e.g. 'What peaceful hours I once enjoyed,' etc. (Cowper, in hymn beginning, 'O for a closer,' etc.). (3.) It should not clash with the doctrinal standards of those who are to use it; for instance, by asserting that heaven (not paradise) is the present abode of the souls of the faithful departed—e.g. 'Jerusalem on high.... My home, *whenever I die*' (Crossman). (4.) It should avoid the mystical and the florid, combining with solidity of thought simplicity (never degenerating into slovenliness) and purity in style, and not allowing intensity of feeling to overcome the limits of chastened emotion, but maintaining a consistent elevation of tone.

Among works on hymnology may be mentioned the following:—Daniel's *Thesaurus Hymnologicus* (1853); J. M. Neale's *Hymns of the Eastern Church* (1863); Sir R. Palmer's (Lord Selborne) *Book of Praise*, selections from the best hymn-writers (1863), and *Hymns, their History and Development* (1892); D. Sedgwick's *Comprehensive Index of Names and Authors of Hymns* (2nd ed. 1863); Archbishop Trench's *Sacred Latin Poetry* (2nd ed. 1864)—the introduction contains much interesting matter, and in particular traces the transition from ancient to modern forms of versification; H. Housman's *Life and Works of J. Eller-*

ton (S.P.C.K., 1896), containing much information in an attractive form; J. Julian's *Dictionary of Hymnology* (1892), an admirable and monumental work; R. M. Moorsom's *Historical Companion to Hymns Ancient and Modern* (2nd ed. 1903) gives the originals of the Greek, Latin, German, Italian, French, Danish, and Welsh hymns; Article 'Hymns' in *Dictionary of Christian Antiquities* (1875), and in *Encyc. Brit.* (9th ed.).

CAROLS.—A carol was originally a song of joy accompanying a dance, being derived from a Celtic root denoting circular motion. It gradually lost its necessary connection with dance measures, while retaining usually, though not always, its religious character. In any case, however, as compared with a hymn, greater width of theme and language is permissible in a carol, though there are many instances where the terms may be used indiscriminately: for example, Bishop Jeremy Taylor (*Life of Christ*, i. iv. 6) calls the 'Gloria in Excelsis' a carol.

Carols were a prominent feature in the middle-age mysteries and miracle plays, but from the reformation till towards 1800 their history is almost a blank. In the early part of the 19th century carols began to be collected and published, and in its later years to be composed as well in large numbers. The great stores in the British Museum have been utilized by English translators—e.g. J. M. Neale.

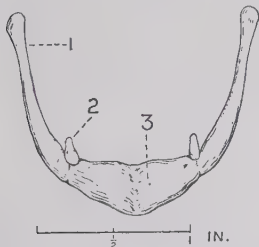
The following are among the most popular collections:—*Christmas with the Poets* (Bell and Daldy), a rich collection of poems and carols from Anglo-Norman times to our own, with illustrations; *Christmas Carols New and Old* (words edited by H. R. Bramley, with illustrations); *Carols, Hymns, and Noëls for Christmastide*, T. W. Staniforth (1883).

HYNDMAN, HENRY MAYERS (1842), English journalist and advocate of socialism, was born in London. In the Italian war of 1866 he acted as correspondent for the *Pall Mall Gazette*, when he made the acquaintance of Mazzini and Garibaldi. All his life he has been an active agitator for 'social remedies,' and in 1881 he founded the Social Democratic Federation. Among his numerous works may be mentioned *Indian Policy and English Justice* (1874); *The Text-Book of Democracy* (1881); *Historical Basis of Socialism* (1883); *Socialism and Slavery* (2nd ed. 1889), a reply to Herbert Spencer; *Commercial Crises of the 19th Century* (2nd ed. 1902); *Economics of Socialism* (1896).

Hyne, CHARLES JOHN CUTCLIFFE WRIGHT (1866), English novelist and traveller, born at Bibury in Gloucestershire. At an early age he contributed to English magazines, and travelled widely in search of literary material. The result has been a long series of novels, including *The New Eden* (1892), *The Recipe for Diamonds* (1894), *Honour of Thieves* (1895; new ed. 1902), and especially the *Adventures* (1898) and *Further Adventures* (1899) of *Captain Kettle*, a character in fiction only second in popularity to Conan Doyle's Sherlock Holmes; further, *Mr. Horrocks, Purser* (1902), *Captain Kettle, K.C.B.* (1903), *Mr Todd* (1903), and *Atoms of Empire* (1904). He also writes under the pseudonym of 'Weatherby Chesney.'

Hyogo, or HIOGO, tn., prefecture Hyogō, Japan, adjoining Kobe, on s.w. of Gulf of Osaka. The port of Osaka, it has been open to Europeans since 1868. Its chief 'lion' is the colossal bronze Buddha erected in 1891. It has shipbuilding yards. The imports are valued at over £12,000,000, and the exports at £7,500,000. Pop., with Kobe (1898), 215,780.

Hyoid Bone, the U-shaped bone which can be felt on pressing deeply into the throat a little below the chin. It supports the tongue, to whose muscles it gives attachment. It consists of a body and four processes or cornua (horns), which project upwards and backwards. In youth the body and cornua are more or less separate, being connected only by cartilages and ligaments, but in old age all the parts become ossified into one bone.



Hyoid Bone.

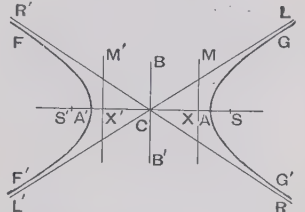
1, Greater cornu; 2, lesser cornu; 3, body.

Hypatia (350-415), ancient philosopher and mathematician, became lecturer on philosophy in Alexandria, succeeding her father as head of the Neo-Platonic school. She attracted many disciples by her wonderful eloquence and intellectual gifts. Synesius, afterwards bishop of Ptolemais, being among the number. Upon Cyril becoming patriarch of Alexandria in 412, Hypatia, according to tradition, was

(5)

seized, torn to pieces, and burnt by the mob. She was author of a *Commentary on Diophantus*, an *Astronomical Canon*, and a *Commentary on the Conics of Apollonius of Perga*; but her works were destroyed with the library at Alexandria. See Kingsley's *Hypatia* (1853).

Hyperæmia. See CONGESTION. **Hyperæsthesia** is a morbid over-acuteness of part of the sensory apparatus. The sense of pain is the one most usually involved, but any of the other senses may be affected. The condition is most commonly associated with hysteria, but is also a symptom of various diseases of the sensory centres in the brain or in the spinal cord, while more rarely it depends on pathological changes in the peripheral or end organs. The *stigmata diaboli* of old, or the marks which the devil was supposed to put upon his own, were frequently hyperæsthetic areas of the skin, which were generally of a hysterical nature.

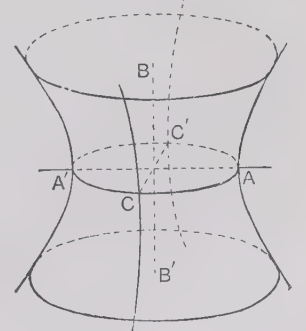


Hyperbola.

Hyperbola, one of the conic sections, is a plane curve such that the distance of any point on it from a fixed point in its plane, called the focus, has to its distance from a given straight line, called the directrix, a fixed ratio greater than unity. The ratio is called the eccentricity. The curve is symmetrical about two lines in its plane called the axes, one parallel to the directrix, and the other through the focus perpendicular to it, and its symmetry indicates another focus and directrix from which it might have been traced. The foci lie on one of the axes and equidistant from the centre, which is ϵ the intersection of the axes. The hyperbola has two branches, each extending to an infinite distance. These branches tend to approach nearer and nearer to two lines drawn through the centre (LCL, RCR'), and are said to touch them at infinity. These lines are called asymptotes. In the figure GAG', FAF' are the two branches of the hyperbola, ss' the foci, c the centre, XM, X'M' the directrices, and AA' the major, BB' the minor axis. Another hyperbola can be found which has LL', RR' as asymptotes and centre C; but the foci

are now on BB', which is now a major axis, while AA' is the minor. This is called the 'conjugate hyperbola.' A characteristic property of the hyperbola is that the difference of the distances of any point on it from the foci is constant. An 'equilateral' or 'rectangular hyperbola' is one whose axes are at right angles. (See GEOMETRY, ANALYTICAL.) In the rectangular hyperbola, the number got by multiplying together the distances from the axes of any point on it is constant. Hence any relation in physical science in which one quantity varies inversely as another—e.g. Boyle's law—can be represented graphically by a rectangular hyperbola. See Smith's or Salmon's *Conic Sections* (6th ed. 1879). The name hyperbola has been given also to certain curves of the third degree. See Talbot's *Newton's Lines of the Third Order* (1861).

Hyperbolic Functions, functions formed by analogy with the circular functions, sine, cosine, tangent, etc., and called the hyperbolic sine, hyperbolic cosine, hyperbolic tangent, etc. As the exponential values of the sine and cosine of the angle θ are $\frac{1}{2}(e^{i\theta} - e^{-i\theta})$ and $\frac{1}{2}(e^{i\theta} + e^{-i\theta})$, where i is the 'imaginary' quantity $\sqrt{-1}$, the hyperbolic sine and cosine, written \sinh and \cosh , are $\frac{1}{2}(e^{\theta} - e^{-\theta})$ and $\frac{1}{2}(e^{\theta} + e^{-\theta})$. (See TRIGONOMETRY; IMAGINARIES.) It should be noticed that $x^2 + y^2 = a^2$ is the equation of the circle, $x^2 - y^2 = a^2$ that of the rectangular hyperbola. See FUNCTIONS; CALCULUS.



Hyperboloid.

Hyperboloid, one of the conicoids. They are surfaces such that their sections by three mutually perpendicular planes would be two hyperbolas and an ellipse. An idea of its appearance may be got in the following manner:—Take two hyperbolas with minor axis in common, and placed so that they are in planes mutually perpendicular. Let now an el-

X-205

lipse be placed with its centre on the common axis, and the ends of its major axis on the one hyperbola and the ends of the minor axis on the other. If it now moves parallel to itself, expanding or contracting, so as to fulfil the above conditions, it will trace out a hyperboloid of one sheet. If the hyperbolas be placed so that the major axis is the common axis, and is of the same length for both, so that the hyperbolas touch at their vertices, and the ellipse fulfil the same conditions as before, the surface traced out will be the hyperboloid of two sheets, the surface being in two separate parts. The equations for these surfaces are of the form—

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1,$$

$$\text{and } \frac{x^2}{a^2} - \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1,$$

respectively. The hyperboloid of one sheet is shown in the figure in which BB' is the common minor axis of the hyperbolas, and AA', CC' their major axis. This surface has the peculiarity that it can be traced out by a straight line moving in a particular manner, and is a shape seen in certain forms of sponge-baskets. See C. Smith's (1884) or Frost's (1875) *Solid Geometry*.

Hyperborei, a fabulous nation, whom the ancient Greeks believed to live 'beyond the north wind,' in a land of perpetual sunshine, and in perfect happiness. Their life is fully described by Pindar (*Pyth.* x.). Herodotus also (bk. iv. c. 32 ff.) discusses the stories concerning them.

Hypericinaceæ, an order of herbs and shrubs with terminal panicles of white or yellow flowers. Many of the included species yield a yellow juice, which in some cases possesses astringent qualities. The flowers are composed of four or five sepals, often marked with dark spots; a similar number of petals, similarly marked; numerous stamens; and a single ovary. The only genus found in Britain is that of *Hypericum*, or St. John's wort.

Hyperides (c. 395–322 B.C.), one of the ten Attic orators, was a professional speech-writer, and in politics was, like Demosthenes, one of the leaders of the Athenian opposition to Philip, and afterwards to Alexander of Macedon. After the collapse of the Lamian war in 322, he was seized by Antipater in a temple at Ægina and put to death. As an orator he may perhaps be placed second to Demosthenes. He was especially distinguished for his wit, irony, and sarcasm, while he was capable of great pathos and dignity of language. More than sixty speeches are attributed to him, but until the discovery of a papyrus about

1850 containing four speeches of his, three of which are incomplete, his writings were represented only by a few fragments. The one completed speech is a funeral oration over the dead who fell in the Lamian war. Two other speeches have been recovered since—viz. those against Athenogenes and Philippiades. Editions by Blass (1894); *Against Athenogenes and Philippiades*, with Eng. trans. by Kenyon (1893). See Jebb's *Attic Orators* (2nd ed. 1893).

Hyperion, in Greek mythology, one of the Titans, a son of Uranus and Gæa, and father of Helios, Selene, and Eos—i.e. the Sun, the Moon, and the Dawn. The Sun-god himself is often called Hyperion by the poets, from Homer downwards.



Hypericum, or St. John's Wort.
1, Pistil.

Hyperite is a rock which consists of hypersthene and plagioclase, felspar with iron ores, and often biotite and augite, sometimes quartz or olivine. Hypersthene andesite is one of the most characteristic rocks of the great volcanic belt which girdles the Pacific, being abundant in the Rocky Mts., the Andes, Japan, the Philippines, and Java. Three famous volcanoes—La Soufrière of St. Vincent, Pelée in Martinique, and Krakatoa—emit hypersthene andesite. In the old volcanoes of North Wales, the Lake District, the Cheviots, and the Ochils it is the commonest rock, and is also very important in the Tertiary volcanoes of Hungary.

Hypermetropia, or LONG-SIGHTEDNESS. See MYOPIA.

Hypersthene, one of the orthorhombic pyroxenes, which differs from enstatite only in containing a larger percentage of iron. It is pinchbeck brown or green in colour, and often has a bronzy sub-metallic lustre, from the presence of minute platy enclosures, which reflect the light from their surfaces (schillerization); sp. gr. 3.4, h.=6. It is a common rock-forming mineral, and great masses occur in Labrador (St. Paul's I.) and Skye. Under the microscope it is pale green to pale brown, slightly dichroic, and has a straight extinction.

Hyperstheneite, a massive hypersthene rock, dark brown, with submetallic lustre, usually coarsely crystalline. It occurs in association with gabbro or norite, and is often weathered to serpentine. The hyperstheneite of St. Paul's Island (Labrador) is well known. Polished slabs of this rock have a dark coppery reflection when viewed at certain angles, and have been used for the manufacture of small ornaments.

Hyperthyroidæ, or **HYPER-THYROIDISM** (excess of thyroid principles), is applied sometimes to the state of poisoning induced by excessive doses of thyroid extract, and sometimes to the disease exophthalmic goitre, whose symptoms are not unlike those produced by such doses, and have been attributed to overproduction on the part of the patient's own thyroid gland. The term hyperthyreæ is also applied to this disease. See **THYROIDISM**.

Hypertrichosis, the condition in which hair develops in an abnormal situation—for instance, on a woman's face, or in connection with a mole. The condition is frequently associated with ovarian disease, or with the menopause. Electrolysis is usually effectual in producing permanent removal, but it is a slow and tedious process. More recently Röntgen rays have been used with success, but caution is necessary with this method of treatment.

Hypertrophy, the term applied in medicine to abnormal growth of an organ or tissue. While it follows an increase in the supply of nutriment, the ultimate causes are often obscure. It may be congenital or acquired. Acquired hypertrophy may be purely physiological, fitting a part for extraordinary work, as in the case of a well-developed muscle. Disease in one organ may cause hypertrophy in another, by throwing extra work upon it. This is often the case in hypertrophy of the heart. Irritation of a part may cause protective hypertrophy. This is seen in the

skin, where a callus, or hard thickened covering, results from frequent pressure, and an embedded bullet, or a bacillus, such as that of tubercle, is often surrounded by a wall of hypertrophied fibrous tissue, and is thus prevented from doing further mischief. Hypertrophy cannot continue indefinitely, and if the cause which originates it persists, or if the strain be greater than the organ can bear, atrophy follows.

Hypnotics are agents which induce sleep. They act in one of two ways, either by producing temporary anæmia of the brain, or by lowering the excitability of nerve-cells. Natural sleep is accompanied by cerebral anæmia, and for this reason a warm bath at bedtime acts as a hypnotic, by dilating the skin-vessels and so diverting a considerable part of the blood-stream from the brain. Warmth applied to the feet, and a full meal, tend to the same result. Various drugs act in a similar way, and are to be distinguished from those which, as narcotics, dull the brain-cells. No hypnotic drug should ever be employed except by medical advice, as the habit of taking such drugs is easily established, and is of extreme danger.

Hypnotism, a term used first by Braid (1796-1860) to cover a series of phenomena described under various names—mesmerism, induced somnambulism, animal magnetism, and the like. The essential unity of all the phenomena in question is now sufficiently established to justify their inclusion under a single term. Few of the facts formerly supposed peculiar to the hypnotic condition are without some hint or parallel in ordinary psychology. Charcot, whose experience was largely with cases of the major hysteria, gave as invariable stages, at least for those cases—catalepsy, lethargy, and somnambulism. Other observers have not confirmed his observations as applicable to all varieties of patients; but, as Binet and Féré point out, Charcot's primary object was to establish the reality of the phenomena by striking instances precisely described. For practical purposes hypnosis may be divided into—*slight hypnosis*, where the voluntary muscles are affected, without loss of consciousness, and without amnesia on waking; *deep hypnosis*, where the sensory system is affected, with, it may be, loss of consciousness to surroundings, and partial or complete amnesia on waking; *somnambulism*, characterized by complete amnesia on waking. Every variety may be present in a single case, at different stages. On the mental side, all stages are

marked by extreme susceptibility to suggestion. The endless variety of detail is best studied in special researches, such as Pierre Janet's *L'Automatisme Psychologique* (1889), or *Névroses et Idées Fixes*.

Methods of inducing Hypnosis.—These may be ranged under two general heads—peripheral stimulations, as by fixing the gaze on a bright object, straining of eyes, 'mesmeric' passes, gentle stroking of eyebrows, pressure on scalp, flashing of mirrors, monotonous sounds, etc.; and central stimulation, as by verbal suggestion of ideas. Probably, however, peripheral stimuli act by suggestion, and the higher cerebral processes are thus always involved. The physiological organism is so subtle that it is impossible to dissociate any merely physical method of inducing sleep from the possibility of suggestion. It is not denied that hypnosis may be induced by a multitude of processes; but suggestion in some form is common to them all, and with the Nancy school (Liébaux, Bernheim, Beaunis, and others) verbal suggestion is very largely relied on, not only for treatment of the patient during hypnosis, but for the inducing of the state itself.

Symptoms of Hypnosis.—The symptoms vary from a slight increase of suggestibility to profound disturbances of the nervous system. In slight hypnosis, for instance, a patient, on being assured that he cannot open his eyes, finds himself unable to do so, consciousness and memory remaining apparently unaffected. In somnambulism, on the other hand, the following features may, at one time or another, become manifest: tonic contractures of the muscles (catalepsy), or wax-like flexibility; increase of muscular strength—e.g. in grasping the dynamometer; paralysis of groups of voluntary muscles according to overt or unnoticed suggestion; maintenance of rigid muscular attitudes for long periods without fatigue (a thing practically impossible in the normal state); change in pulse and respiration rates; changes in general vasomotor functions, including changes in secretions, redness of skin, perspiration, etc.; alterations of sensation by suggestion—vision, smell, taste, muscular sensation, cutaneous sensation, including touch and temperature; alterations of appetites; induced hallucinations; increased appreciation of time; extreme excitability of whole nervous system. The memory is, as it were, divided into a normal memory of current consciousness, and a hypnotic memory, which recalls, at each re-

newal of the hypnotic state, the events of the previous séance, but forgets the events of ordinary life. On this basis, double, treble, multiple personalities can be constructed. Janet has shown that events long forgotten can be evoked in somnambulism. Fixed ideas are unveiled in their relation to forgotten experiences. New fixed ideas can be established with greater or less permanence, and old ones dislodged or disintegrated. The most constant feature of induced somnambulism is the absolute failure on waking to recall a single experience of the somnambulist state. The somnambulist's mind is filled with dirigible dreams, which vanish absolutely on waking, but return on the next hypnotizing. In neuropathic subjects these phenomena vary almost beyond the possibility of general classification.

Susceptibility.—Of 8,705 persons, hypnotized by various observers, 6 per cent. were found uninduced, 15 per cent. were somnambules, 78 per cent. were susceptible in lesser degrees (Schrenck-Notzing, quoted by Bramwell). Liébaux failed in only 3 per cent. of 1,756 consecutive cases; Wetterstrand in 3.7 per cent. of 3,209 cases. Probably the vast majority of persons are more or less susceptible. In his first five hundred cases Milne Bramwell found only two failures, and as many as 48 per cent. became somnambules. He explains that susceptibility depends a good deal on the gaining of the patient's confidence in advance. Among the five hundred, many were 'healthy persons hypnotized for operative purposes.' Moll's conclusions coincide with these.

Theories of Hypnotism.—Various attempts have been made to unify hypnotic phenomena. Mesmer assumed a 'vital fluid,' capable of passing from operator to patient—a 'sensitive.' Braid emphasized the purely subjective factor in hypnosis, the cardinal fact being a predominant or fixed idea. The physiological counterpart was supposed to be some action of the cerebral 'fibres of association.' The Salpêtrière (a hospital in Paris) theory regards hypnosis as pathological, and correlates it with other neuroses. The Nancy (France) school regard suggestion as an all-sufficient explanation. In all these theories, 'rapport,' or the peculiar, intimate relation between operator and patient, plays an important part; but it is by many held to be simply the result of repetition of hypnosis by the same operator—in other words, the result of expectation or suggestion. The facts are admirably analyzed by Pierre Janet in

Névroses et Idées Fixes (i. ch. xii.). The 'sommnambulist passion' and the 'desire for direction' are manifestations of the same fundamental fact as 'rapport.' The most recent theory of hypnosis is that it is based in 'subliminal' or secondary consciousness, being a mode of exploiting such consciousness directly. Others regard hypnosis as associated with induced cerebral exhaustion; but the subconsciousness theory offers greater possibilities of explanation. In all expositions of theories there is a tendency to use words like 'idea,' 'psychical,' 'suggestion,' etc., as if they were not always associated in fact with some form of nervous activity. But the suggestion to 'sleep,' whether conveyed by a word, or a gesture, or a manipulation, is always 'let into' the cerebrum by a sense-channel, and the mental action so induced will be in each case accompanied by the peculiarly subtle nerve-action corresponding to the particular mode of inducing suggestion. The cerebral apperception is inseparable from the psychical, however much the one or the other may be emphasized in particular terms like 'idea' or 'psychical suggestion.' No theory can yet be regarded as other than provisional.

Uses of Hypnotism.—In education the use of hypnotism is practically unknown. The cases of improvement recorded are chiefly cases of vicious habits in children; but this is not so much education as therapeutics. In therapeutics, however, there is no doubt of the value of hypnotic treatment, especially in functional neuroses—e.g. 'grande hystérie' and allied disorders. The works of Pierre Janet and Professor F. Raymond team with good results in such cases. Similarly, in hysterical mental troubles—obsession, melancholia, etc.; in vicious and degenerate children; in dipsomania, morphinomania, etc.; in epilepsy; in functional disorders of the secretions; in stammering; in sea-sickness; in rheumatism; in certain neurotic skin diseases; in obstetrics—many successful results are recorded. The primary danger in the use of hypnotism, especially at the hands of the unskilled, is the production of obscure nervous affections more or less permanent in character. The relation of hypnotism to responsibility and the possible perpetration of suggested crimes are still undecided questions. Normally, no average adult can be hypnotized without assent; but assent can be itself in certain cases induced. In a recent French criminal trial, Bernheim maintained that the crime was committed under hypnotic suggestion.

Literature.—Bernheim's *Suggestive Therapeutics* (1892), good in detailed description and treatment; Binet's *Alterations of Personality* (1896), an experimental study of multiple personality by hypnotic method; Binet and Féré's *Animal Magnetism* (1887), a good general account from Salpêtrière standpoint; Bramwell's 'Hypnotism,' in *Encyc. Medica*, vol. v. (1900), a compact summary of methods and practical applications; James's *Princ. of Psych.* (1892), vol. ii. ch. xxvii., a critical analysis of theories; Pierre Janet's *L'Automatisme Psychologique* (1889), an elaborate study of subliminal consciousness, or systematized subconsciousness, with inductive study of cases; Janet and Raymond's *Névroses et Idées Fixes* (1898), on the same lines; Moll's *Hypnotism* (1890), a general account of practice and criticism of theories; Myers's 'The Subliminal Consciousness,' in *Proc. Soc. Psych. Res.* (since 1892); Parish's *Hallucinations and Illusions* (1897); Max Dessoir's *Bibliographie* (1888), important for reference; and Charcot's works, for clinical methods.

Hypnum, a genus of mosses with a double peristome, capsule at the end of a long stalk or seta, conical calyptra cleft on one side, and vaginule attached to perichaetial bractlet.

Hypocaust, in Roman baths and villas, a hollow space under the *calidarium*, where heat from the furnace (*hypocaustus*) was accumulated, and carried by passages (*cuniculi*) to other stories. Also explained as 'a vaulted room heated from below,' and by some identified with the furnace itself (Winckelmann's description of a villa in Tusculum). In baths it lay between the apartments of the men and women, and contained means of warming water in vases.

Hypochaeris, or CAT'S EAR, a genus of composite plants, characterized by strap-shaped florets, an oblong, imbricated involucre, and a feathery pappus. The common long-rooted cat's ear (*H. radicata*) of British hedgerows bears large yellow flowers at the ends of the branches of the long smooth flower-stalk in early autumn. It has leaves, coarsely dentate, radical leaves.

Hypochlorites. See HYPOCHLOROUS ACID.

Hypochlorous Acid, HClO, is obtained by distilling bleaching powder with dilute nitric acid. It forms a colourless solution in water, that has a peculiar 'chlorous' smell and strong bleaching properties. Its salts, the hypochlorites, are almost unknown in the pure state, and are obtained along with chloride when chlorine is made to act in the cold on the hydroxide of an alkali, or alkaline

earth, metal. Eau de Javelle is such a mixture of potassium chloride and hypochlorite obtained in this way, whilst in the similar calcium compound known as 'chloride of lime' or 'bleaching powder' the chloride and hypochlorite are probably chemically combined instead of mixed. Free base and water are also present in such preparations, which are largely employed for bleaching, and also as a disinfectant, chlorine being set free by excess, and hypochlorous acid by smaller quantities of acids. See BLEACHING POWDER.



Hypochaeris radicata.
1. Floret and scale.

Hypochondriasis is a mental disorder often associated with digestive and biliary disorders; but its graver forms are allied to melancholia, and result from mental disease. The slighter degrees of hypochondriasis are shown by exaggeration of trifling ailments and undue fears that the patient is the victim of serious disease. Hypochondria is more frequently found in the well-to-do than in the poor, whose mental or bodily exertion in the struggle to earn a living gives them no time for brooding over their symptoms, whether real or imaginary.

Treatment.—The best general scheme for the sufferer and his friends to follow is that which ensures for him a physically and mentally active existence, with as many interests as possible outside himself.

Hypodermic Injection is a method of introducing drugs beneath a patient's skin by means of a small syringe attached to a hollow needle. A dose smaller than would be required were the drug given by the mouth suffices to produce the desired effect, and its action is more speedy than that of a larger dose. Again, by hypodermic injection drugs may be administered to patients who, from insensibility, gastric intolerance, or other reasons, are unable or unwilling to take medicine by the mouth. A fold of the skin is pinched up between the finger and thumb of the left hand, and the needle is driven sharply in with the right. The contents of the syringe are then slowly injected, and the needle quickly withdrawn. Certain drugs which cause irritation when injected immediately below the skin should be introduced into a large muscular mass such as the buttock. The remedies so given include sedatives, analgesics, antitoxins, emetics, stimulants, antiseptics, astringents, etc.

Hypophosphorous Acid, H_3PO_2 , is prepared by the action of dilute sulphuric acid on barium hypophosphite, the latter being obtained by heating barium hydroxide with phosphorus. It is separated from water by evaporation and crystallization, and forms a fusible white crystalline solid that is a powerful reducing agent, and is decomposed by heat, setting free phosphoretted hydrogen. It forms a series of salts, the hypophosphites, which are used in medicine.

Hypostasis, a Greek word signifying substance or substantial existence. At first used simply to signify the divine substance or nature, the term was later applied to the persons or individual existences within the one substance of God, another word, *ousia*, being available to denote the one substance of which each person was a hypostasis. But later again the word hypostasis, which is the natural equivalent of the Latin *substantia*, came itself to be used to denote the one divine substance, while another term, *prosopon*, was used to correspond to the Latin *persona*.

Hypotenuse, the side which subtends the right angle of a right-angled triangle. The square on it is equal to the sum of the squares on the other sides. The hypotenuse is also the diameter of the circle circumscribing the triangle, and therefore its middle point is equidistant from the three angles.

Hypothec, in Scots law, the right of a creditor in certain cases over property in the possession of the debtor. The fol-

lowing are the principal instances—(1) A law agent has a hypothec for expenses over property recovered in an action; (2) the hypothec of an urban landlord over his tenant's furniture, etc., for a year's rent—it is enforced by sequestration brought in the sheriff's court within three months of the last payment; (3) maritime hypothec—as, for instance, of a seaman for his wages over his ship.

Hypothesis may be used widely to signify any supposition; but in the logic of science it signifies a conception or principle supposed in order to explain or bring into intelligible connection a number of given facts whose relations are not clearly understood. When the conception or principle thus supposed is seen to be precisely fitted to explain the facts, the hypothesis is proved or verified, and ranks as an accepted theory of science. See Mill's *Logic*, bk. iii. ch. xiv. s. 4 f.; Jevons's *Principles of Science*, ch. xxiii.; and Bosanquet's *Logic*, vol. ii. ch. v.

Hypsipyle, in Greek legend, the daughter of Thoas, king of Lemnos. When the Lemnian women killed all the men in the island, she saved her father and hid him. When Jason visited Lemnos with the Argonauts, she became the mother of twin sons by him. Later, when the women discovered that her father was alive, they expelled her from the island; in her flight she was taken by pirates and sold to the Nemean king Lycurgus.

Hyracotherium, the best-known representative of a family of extinct ungulate mammals, which rank as the oldest and most primitive perissodactyls. Their teeth have short roots, and in their tuberculate surfaces indicate a low degree of specialization. Their fore feet had four toes, the hind feet only three, all of which appear to have been functional and to have reached the ground. The radius and ulna were free and not fixed together. The typical genus is found in lower Eocene beds in England, France, and N. America. Closely related to it were *Eohippus*, *Pachynolopus*, and *Orohippus*, which are believed to be early ancestors of the horse. The existing tapirs appear also to have been derived from this stem.

Hyra, the name applied to a group of small ungulates found in Africa, Arabia, and Syria. They are somewhat rabbit-like in appearance; hence the name coney applied to them in the English translation of the Bible. This resemblance to rodents is partly due to the nature of the teeth; for in the upper jaw there are two incisors which are rootless, semicircular in shape, and

separated by a distinct gap from the other teeth. In details of structure these teeth are, however, very dissimilar to those of rodents; and there are two pairs of lower incisors, a peculiarity which does not occur in any rodent. The cheek-teeth somewhat recall in structure those of a rhinoceros. There are four functional toes on the fore foot, with a rudiment of another, while the hind foot has only three toes. The muzzle is sharply pointed, the ears rounded, the hair thick and nearly uniform in colour.



Hyra, or Coney.

Near the middle of the back there is a remarkable gland, surrounded by hairs of a different colour from those covering the rest of the body. The tail is rudimentary. An average size is a length of twenty inches, with a height at the shoulder of eight. Examples are the Syrian hyrax (*Procavia syriaca*), the Cape hyrax or klipdas (*P. capensis*), and the Abyssinian hyrax (*P. abyssinica*). They are placed in a special sub-order as Hyracoidea.

Hyrcania, prov. of ancient Persia, on S. and S.E. shores of Caspian Sea.

Hyrcanus, Jewish high priests. (1.) JOANNES, the son of Simon Maccabæus, who restored the independence of Judæa. He succeeded his father in 135 B.C., and held power until his death in 106 B.C. He was the founder of the Jewish monarchy, which continued in his family until Herod secured the kingdom of Judæa. (2.) Son of Alexander Jannæus, in 79 B.C. succeeded to the throne. His brother Aristobulus succeeded in dispossessing him, but in 63 B.C. Pompey made himself master of Jerusalem, and established Hyrcanus as king in power, though not in name. Even after that Aristobulus caused him much trouble until his death in 49 B.C. In 40 B.C. Hyrcanus was captured by the Parthians, and kept prisoner at Babylon for several years. About 32 B.C., however, he returned to Jerusalem, where Herod was now supreme; and in 30 B.C. he was executed by Herod on a charge of treasonable correspondence with Malchus, king of Arabia.

Hyslop, JAMES (1798-1827), Scottish poet, born at Damhead, Dumfriesshire; was a self-taught shepherd lad, but became in turn

schoolmaster, parliamentary reporter, and tutor on board a man-of-war. Of his *Poems* (collected in 1887 by the Rev. Peter Mearns), the most popular was *The Cameronian Dream*, contributed to the *Edinburgh Magazine* in 1821.

Hysmine and Hysminias, THE DRAMA OF, a romance written by Eumathius, or Eustathius, a Greek novelist of the 12th century, a native of Constantinople, or of the Egyptian town of Parembol. It was first edited, with a Latin translation, by G. Gaulmin (1617); and a French translation was made by Lebas, with introduction (1828).



Hyssop.

1, Bud; 2, corolla laid open.

Hyssop (*Hyssopus officinalis*), a hardy, semi-herbaceous plant, of the order Labiatæ. It has herbaceous stems springing from a shrubby base; entire, oblong, sessile leaves; and whorled spikes of blue, labiate flowers in summer. It is strongly aromatic, pungent, and bitter; and the leaves are used as flavouring in salads, and

also in the manufacture of absinthe. The dried flowers have a popular reputation as a medicine, and are also used in soups. The herb is easily grown in a light, sandy soil, in a warm situation.

Hystaspes, a Persian, of the royal house of the Achæmenidæ, famous chiefly as the father of Darius I. He was satrap of Persia under Cambyse.

Hysteresis. See MAGNETISM.

Hysteria is a nervous disease which was at one time supposed to be peculiar to women, and which was attributed entirely to unhealthy conditions of the womb. It results, however, from an instability of the nervous system, and is apt to follow an emotional strain. Women are more liable to hysteria than men, since woman is usually more emotional, her nervous system is periodically subjected to strain, and her education and mode of life often increase the liability. Man, however, may be as hysterical as woman, especially about the time of puberty. The term 'hysteria,' however, is used very loosely, even by physicians. The hysterical patient is very imitative, and her symptoms may simulate those of almost any other nervous disorder. The mildest form of hysteria often ends in laughter and tears together, and is followed by a headache and a sleep. In graver forms the patient may rock herself violently to and fro, fall, or dash herself on the ground, apparently unconscious. In markedly hysterical people these exhibitions occur without adequate provocation, and the sufferer very seldom injures herself even in her most violent transports.

There is every reason to think that most of the fasting-girls, and those cases of long-continued trance occasionally recorded, are hysterical. In exaggerated cases, such as are rarely seen except among the Latin races, there may be vivid delusions and hallucinations.

Everything must be done to encourage self-restraint, and interest in outside affairs. Selfishness, introspection, and idleness must all be guarded against. Particular care in guarding against both over-emotion and over-work

is necessary at puberty. Plain food in plenty, outdoor life as far as possible, and active games are very useful. The Weir-Mitchell treatment, of isolation, complete rest in bed, massage, and 'over-feeding,' is of the greatest service. In an acute attack the sufferer should be so placed that she runs no risk of bodily injury, and her efforts to attract attention should meet with kindly ridicule or indifference.

Hystero-epilepsy is a variety of the disease which is often difficult to distinguish from true epilepsy. In hystero-epilepsy some trivial cause is usually apparent. There are often screams during the attack; the fall is calculated not to do injury; rigidity often continues for some time; the tongue is not bitten, but lips, hands, and inanimate objects and other people may be. The sufferer may talk through the attack, which may last ten minutes or much longer, and which may be cut short by firm treatment, and possibly unpleasant remedies. *Railway spine*, or *railway brain*, is another disorder sometimes classed among the forms of hysteria, on account of the grave nervous symptoms which develop some time after the accident, without any visible damage to account for them. Such cases often occur after collisions. The sufferers may have no idea of injury at the time, and may be active in helping others, but weeks afterwards they may develop paralysis or mental symptoms which render them quite unfit for activity of any kind. The effects are usually attributed to 'shock,' but in many cases the condition depends upon serious nerve injury.

Hystrix, the genus to which the porcupine belongs.

Hythe, munic. and parl. bor., Cinque port, and bathing resort in Kent, England, 5 m. W. of Folkestone. The Hythe School of Musketry affords accommodation for about four hundred officers and men of the British army. There are a fine beach and golf course. The harbour is now accessible only for fishing-boats. Hythe returns one member to the House of Commons. Pop. (1901) 5,557.

I. The primary Greek and Latin value of this letter is that in the word 'machine' (high front narrow—Murray). Closely related is the short 'wide' vowel in 'pit' (Murray). In a general scientific notation *i* may include both groups; most modern languages use it to express these values. The sound of the English name is a diphthong, and is a value of *i* quite peculiar to English. It appears from the 15th century. *I*, in Latin, had a consonantal value also, like English *y* (cf. 'million,' etc.). Other sounds of *i* are not common in English. The Semitic value of *i* was consonantal *y*. Its affinity to *i*, and its tendency to become silent, marked it out for vowel representation in the Greek alphabet. The early Semitic form is like a Z, but with a third horizontal stroke in the middle. It quickly simplified itself in the Greek alphabet to its present form. There was a similar development in the Aramaic alphabet, resulting in Hebrew *y*. Since the 11th century, first an accent and then a dot have been employed to distinguish *i* from other letters. The same mark is found in Greek MSS., although not employed in Greek printing. The meaning of the Semitic name *yodh*, Greek *iota*, is 'hand.'

Iacchus, the name of the god Bacchus as worshipped in the Eleusinian mysteries.

Iambic Verse, in Greek and English prosody, verses composed of iambic feet. The iambic foot is dissyllabic. In Greek the first syllable was long, the second short; in English the unaccented or short syllable stands first, being followed by one which is accented or long. Iambics are generally used in groups of five, or pentameters, usually without rhyme, when they constitute 'heroic blank verse.' When rhyming in couplets they are 'rhyming heroics.'

Iamblichus, Neo-Platonic philosopher, was a native of Chalcis in Coele-Syria, and spent his life in Syria; he is believed to have died before 333 A.D. He was an ardent student of the philosophy of Plato and Pythagoras, and was also versed in the lore of the Chaldeans and Egyptians. His philosophy was a syncretism of Platonic and Pythagorean doctrines, mixed with Oriental mysticism, his cardinal thesis being that communion with the Deity was possible for man by means of theurgic rites, such as initiations and mysteries. His principal works are *The Philosophy of Pythagoras* (ed. Kiessling, Nauck, and others, since 1668;

Eng. trans. 1818), and *On the Mysteries* (ed. Parthey, 1857; Eng. trans., new ed., 1895). He also wrote commentaries on several of Plato's *Dialogues*, and on Aristotle's *Analytics*.

Ianthina, the genus to which belong some beautiful pelagic gasteropods of a violet colour. They float at the surface of the sea, with the thin shells upturned, and feed on various kinds of jelly-fish. A special peculiarity is the 'raft,' which is attached to the foot, and has the egg capsules suspended from its under-surface. This raft or float consists of mucoid substance, and is filled with air-bubbles, by means of which it sustains the attached animal at the surface of the water.

Iapetus, the eighth satellite of Saturn. It has a period of seventy-nine days, and an orbital radius of 2,225,000 miles. Like our moon, it turns always the same face towards its primary.

Iapetus, one of the Titans, son of Uranus and Gæa, and brother of Cronus, Oceanus, Hyperion, etc. He was the father of Atlas, Prometheus, Epimetheus, and Menæstus. After the war of the Titans against the gods he was imprisoned by Zeus in Tartarus.

Iapygia, the name given by the Greeks to the S.E. part of Italy, known to the Romans as Apulia.

Ibadan, tn., British colony of Lagos, W. Africa, 120 m. N.E. of Lagos by rail (opened in 1901). Pop. about 200,000.

Ibague, chief tn., dep. Tolima, Colombia, 65 m. w. of Bogota; with hot springs, and mines of sulphur and silver (not now worked). Pop. 13,000.

Ibarra, tn. and bishop's see, cap. of prov. Imbabura, Ecuador, 50 m. N.E. of Quito. It stands at the foot of the volcano of Imbabura. In 1868 it was visited by a destructive earthquake. Pop. 10,000.

Ibea, the name applied to British E. Africa when under the control of the Imperial British E. African Company, whose initial letters made the word.

Iberia. (1.) The name given by the Greeks to Hispania, or Spain; whence Iberian Peninsula. (2.) The ancient name for Georgia in the Caucasus.

Iberian Sea, that part of the Mediterranean which lies between Spain on the N. and Morocco and Algeria on the S.

Iberis. See CANDYTUFT.

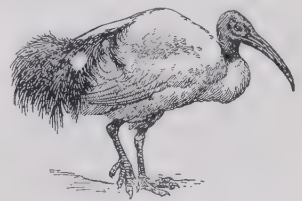
Ibex, a name given to four nearly allied species of wild goat—viz. the Alpine ibex (*Capra ibex*); the bearded ibex of the Himalayas (*C. siberica*), a species with a wide distribution in Asia; the

Arabian ibex (*C. sinaitica*); and the Abyssinian ibex (*C. waliae*). The first-named is extinct as a wild animal, though it is preserved by the Italian government in some of the Piedmont valleys. The habits resemble those of the Himalayan ibex.



Alpine Ibex.

Both species are nearly uniform in colour, and have their long horns ornamented with transverse ridges. The natural habitat is the margin of the snow-line, where the animals live in flocks, the sexes keeping separate during a great part of the year. Two kids are produced every summer, the pairing season being in winter. The Asiatic species may stand forty inches at the shoulder, and the horns of the male may reach a length of fifty-one inches. In both respects the Alpine ibex is greatly inferior, but this may be due to the fact that it is a dying species. The Spanish wild goat is sometimes called an ibex. See GOAT.



The 'Sacred' Ibis.

Ibis (Ibididae), a family of birds related to the storks, and mostly found in warm countries. The bill is long, slender, and nearly cylindrical, tapers towards the tip, and is more or less arched. The head is always more or less bare of feathers, the tail is short, and there are generally tufts of plumelike feathers near the posterior end of the body. The most famous member of the family is the sacred ibis (*Ibis aethiopia*) of the ancient Egyptians, often found as a mummy in temples.

This bird does not now occur in Egypt, save as an occasional migrant, but is plentiful on the Upper Nile, and extends southwards to the Cape. The plumage is generally white, with black head, neck, and dorsal plumes. The widely distributed glossy ibis (*Falcinellus igneus*) occasionally occurs in England, while the scarlet ibis (*Eudocimus ruber*) is confined to America. Numerous other species occur scattered over the greater part of the globe. To the same family as the ibises belong the spoonbills.

Ibn Batûta, Moorish traveller, whose proper name was ABU ABDULLAH MOHAMMED, was born at Tangier, Morocco, in 1304, and died at Fez in 1377. He spent thirty years of his life (1325-55) in travelling through the west and south of Asia, during the course of which he lived some time at Delhi, and went (doubtfully) as far as Cambaluc (Peking). He also visited Mombasa and Quiloa, Bolgar on the Volga, Hormuz in the Persian Gulf, Khwarezm (Khiva), Sumatra, and Timbuktu. His travels were published (original Arabic and French trans.) by DeFrémery and Sanguinetti in 4 vols. in 1855-59 (3rd ed. 1893); Eng. trans. by Samuel Lee (1829) and Mohammed Hussein (1898).

Ibn Ezra, more properly ABRAHAM BEN MEIR IBN EZRA (1092-1167), Jewish scholar, also known as Abraham Judeus, Abenare, and Avenara born at Toledo in Spain; travelled through Europe, including England (1157-8), and died in the island of Rhodes. In addition to works (in Hebrew) on grammar and philosophy, he wrote commentaries on the Bible—in English trans. *Commentary on Isaiah* (1872) and *On the Canticles* (1874). His mathematical and astronomical works throw much light upon the methods and knowledge of the Arabs in the 12th century. Some of Ibn Ezra's hymns are still used in the synagogue.

Ibn Gabirol. See AVICEBRON.

Ibn Haukal, MOHAMMED (d. 976), Arabian geographer and traveller, born probably at Bagdad; for thirty years travelled between the Atlantic and Indus, collecting material for his *Al Masalik w'al Mamalik* ('A Book of Roads and Kingdoms;') Eng. trans. by Sir W. Ouseley, 1800.

Ibn Khallikan, ABRAS AHMED (1211-82), Arabian scholar, born at Arbela in Mesopotamia. For some time he resided in Egypt, was later grand-kadi at Damascus (1261-70), and at Cairo became professor in one of the colleges. His chief work, translated into English by MacGuckin de Slane (1842-6), was a *Biographical Dictionary of Famous Moslems*.

Ibn Tofail, ABÛ-BEKER MOHAMMED IBN (12th century), Arabian philosopher and physician, a native of Guadix in Spain. He was an able physician, but his reputation now rests on his semi-philosophical romance, *Hajj ibn Yokhdân*, trans. into English by Ockley (1708), and by Peacock (1874).

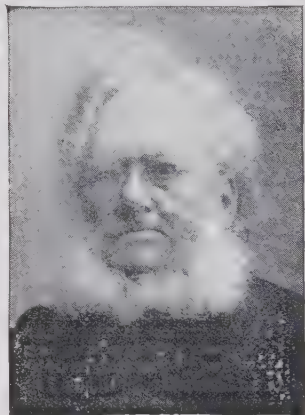
Ibn Zohr, AVENZOAR, or ABU MERVAN (1072-1162), Arabian physician, born near Seville, was teacher of physics to Averroes. He wrote the work *Al-Taysir*, considered of the utmost value by Arab physicians; Latin trans. as *Rectificatio Medicationis et Regiminis* (1490).

Ibrahim Pasha (1789-1848), viceroy of Egypt, born at Cavalla, Roumelia, adopted son of Mehemet Ali, Turkish viceroy of Egypt. He repressed the Arabs in Upper Egypt (1810), and subdued the revolt of the Wahabis in Arabia. When the Greek war of Independence broke out, Ibrahim, in answer to the Sultan's appeal for aid (1824), marched into Greece, taking Navarino and Tripolizza, and, after a heroic defence, Missolonghi (1826), but retired after the battle of Navarino (1827). Next, in consequence of a quarrel with the pasha of Acre, he invaded Syria (1831), captured Gaza (1837) and Acre, and defeated the Turks (1832), when the powers, intervening, checked further progress. The same thing happened again after the defeat of the Turks at Nisibis, near the Euphrates (1839).

Ibsambul. See IPSAMBUL.

Ibsen, HENRIK (1828), Norwegian dramatist and poet, born at Skien. In 1850 he published his first drama, *Catilina*. Through the influence of the violinist Ole Bull, he became director of the theatre in Bergen. Here he remained until 1857; but of the dramas of this period he has only published two—*Fru Inger til Østråt* and *Gildet på Solhaug*. He next became director of the Christiania theatre (1857), for which he produced three new plays—*Hærmændene på Helgeland* (1858), *Kongsemnerne* (1864), and the satirical comedy *Kjærlighedens Komedie* (1862). The last-named piece aroused much indignation; the theatre failed (1862); and Ibsen left (1864) his native land for Rome, where he composed the characteristic lyrical dramas *Brand* (1866), *Peer Gynt* (1867), *De Unges Forbund* (1869), and *Kejser og Galilæer* (1873). He lived chiefly in Rome, Dresden, and Munich until 1891, when he returned permanently to Christiania. *De Unges Forbund* was the first play dealing with social subjects, and written in that crisp, concise, pregnant prose so characteristic of Ibsen's problem dramas; the other plays were in verse. Ibsen

is, above all, a satirist: the enemy of conventionality and hypocrisy. Thus, in *Samfundets Støtter*—‘The Pillars of Society’—(1877) he condemns social pretences; in *Et Dukkehjem*—‘The Doll's House’—(1879) the middle-class treatment of women is criticised; in *En Folketjende* (1882) he shows up the cowardice of public opinion, and in *Gjengangere* (1881) modern marriage and pre-nuptial profligacy. In the later dramas, however—e.g. *Vildanden* (1884), *Rosmersholm* (1886), *Fruen fra Havet* (1888), *Hedda Gabler* (1890), *Bygmester Solness* (1892), *Lille Eyolf* (1894), *John Gabriel Borkman* (1896), and *Når vi Døde Vægner* (1899)—the moral intention is obscured by the same mystical note that flashed out so brilliantly in *Peer Gynt*. Ibsen's plays have revolutionized dramatic art. He is the greatest realistic playwright of the period,



Henrik Ibsen.
(Photo by Nyblin.)

and has consummate mastery of stage technique. It is not so generally known that Ibsen is also great as a poet. His *Digte* (2nd ed. 1875) are beautiful, though in places obscure. His *Samlade Værker* were published in 1898 and 1902. Best German ed. of works (1898); English ed. of plays, *Prose Dramas*, ed. Archer (1890-2); another ed. by E. Gosse (1899). See Brandes' *Ibsen* (1898); Passarge's *H. Ibsen* (1883); *Best Life* by Jæger (1888; Eng. trans. 1894).

Ibycus, a Greek lyric poet of the 6th century B.C., was a native of Rhegium in Italy, but lived chiefly at the court of Polycrates, tyrant of Samos. His poems treated especially of the subject of love, but only a few fragments are now extant. Schiller's ballad tells the story of ‘The cranes of Ibycus.’ The fragments will be found in Bergk's *Poeta Lyrici Graeci* (vol. iii. 1882).

Iça, maritime dep., Perú; has an area of 8,718 sq. m., and a population of (1896) 90,962. The climate is hot and dry, and the soil is poor, with the exception of the valley, where the vine, sugarcane, tobacco, cotton, indigo, and rice are grown. Its capital is Iça, on r. bk. of the Iça R., 180 m. S.E. of Lima. Pop. about 10,000.

Iça, or **PUTUMAYO**, trib. of the Amazons, rising in the Colombian Andes, flowing S.E., and joining the Amazons near San Antonio, Brazil. It is some 1,000 m. long, and in the wet season is navigable most of the way up.

Icarius. (1.) An Athenian, who entertained the god Dionysus on his arrival in Attica, and was taught by him the culture of the vine. Icarius was killed by certain peasants to whom he had given wine, and who, being drunk, thought they were poisoned. His daughter Erigone and her father were placed by Zeus (or Dionysus) among the stars—she as the Virgin, Icarius as Boötes or Arcturus, and the dog as Procyon or Canis Minor. (2.) The father of Penelope, wife of Odysseus. He promised her to the man who should beat him in a foot-race; in this contest Odysseus succeeded.

Icarus. See **DÆDALUS**.

Icarus, or **ICARIA**. See **KARIOT**.

Ice, the solid form which water assumes below a certain temperature. In all cases ice is crystalline, snow and hail being masses of small particles clinging together; but ice has certain physical properties peculiar to itself. These may be said to depend on the fact that it is less dense than the water out of which it is formed in the act of freezing. Thus, ice floats on water, having a specific gravity of about 0.92. Consequently, when water becomes ice it expands, whereas, generally, the cooling of a liquid to the solid form is accompanied by contraction. It was this fact which, interpreted in the light of the principles of thermodynamics, led James Thomson to the theoretic discovery of the lowering of the melting-point of ice by pressure. The experimental proof was given by his brother William (now Lord Kelvin), who then gave the complete thermodynamic relations that subsist between melting and boiling points on the one hand and pressure on the other. There is no doubt that this melting of ice under pressure explains some of its most characteristic properties. But it is only when the ice is near its melting-point that the lowering of the melting-point by pressure is accompanied by a real melting. Very cold powdery snow does not readily make into snowballs. Similarly, hard cold ice is difficult to skate on, simply because

the pressure of the skate on the ice is not sufficient really to melt the ice beneath it. Strictly speaking, the skater does not skate so much on ice as on the water into which the ice momentarily melts. The same property of melting under pressure is an important factor in glacier motion, and in certain cases of what Faraday called regelation—viz. the property possessed by two pieces of ice of freezing together when simply laid in contact. See **FREEZING**. Large quantities of natural ice are imported, principally from Norway. The ice is gathered in winter, cut into blocks, stored in ice-houses, and distributed as required. For the production of artificial ice, see **REFRIGERATION**.

To melt ten pounds of ice requires the application of as much heat as would raise eight pounds of water from the freezing-point to the boiling-point. This is usually expressed by saying that the latent heat of water is 80 units of heat, the unit of heat being the amount of heat required to raise a pound of water 1° C. in temperature. No other simple liquid is known to have so high a value for its latent heat. Ice is of great value as a cooling agent for use in keeping down the temperature of fever patients, and for preserving fish and meat for longer times than would be otherwise possible. The change from water to ice and from ice to water cannot be made rapidly, the freezing of the water when the environment is cooling, and the melting of ice when it is getting warmer, having a distinct retarding effect upon the change of temperature which is producing the change of state.

Ice and snow in the making and unmaking are powerful geological or physiographical agents. For example, when water which has percolated into the cracks of rocks freezes, it tends by its expansion to force the crack wider, and hasten the disintegration of the rock. The resistless downward motion of glaciers or ice-sheets is accompanied by a grinding of the surfaces over which they pass. The rounded forms and striations so produced are unmistakable, and have taught the geologist that many lands at present free of ice were in former times covered with extensive ice-sheets. Greenland is the most familiar example of a country entirely covered by a great ice-sheet. This sheet is not steady, but is gradually working down from higher to lower levels. Where the margin reaches the sea, portions float up and break off, and finally drift away with the ocean currents as icebergs.

Ice Age. See **GLACIAL PERIOD**.

Iceberg, or **ICE MOUNTAIN**. In Baffin Bay Sir John Ross saw icebergs aground in 1,500 ft. of water. Arctic bergs are often 200 or 300 ft. above water, and Antarctic, generally tabular in shape, from 580 to 700 ft.; and the submerged portion of regularly formed icebergs is generally in the proportion to the visible as 8'7 to 1'0. The glaciers (Jakobshavn, Humboldt, etc.) of the Greenland icefield supply most of the Atlantic icebergs, and the Antarctic ice-sheet those of the Southern Ocean. Where these great glaciers creep into the sea, the icebergs break off and float, to drift away in fleets. They are seldom found south of 40° N. lat., or north of 35° S. lat. There are none in the N. Pacific, owing to the shallowness of Bering Strait. Icebergs melted by the Gulf Stream have formed the great Newfoundland bank. They occasionally transport Polar animals. The Hudson Bay and Iceland climates are altered by them for the worse. See *Ice-work, Present and Past*, by Bonney (1896).

Ice-breaker, a specially constructed steamer used for forcing a passage through ice-bound waters. Several of these vessels have been put in use on Lake Baikal and in the Baltic. In the Baikal ferry-boat the hull is subdivided by numerous bulkheads for safety, and has a heavy cast-steel stem and armoured bow, to break up the icefield. The *Ernak*, or *Yermak*, the most effective ice-breaker yet built, was launched on the Tyne in 1898 for the Russian government. She is 305 ft. long, with a breadth of 71 ft. and depth of 42½ ft.; of 8,000 tons displacement, and engines of 8,000 I.H.P., giving a speed of 15 knots. She is built of steel, enormously strengthened in the peculiarly constructed bow, which slopes upward from below, so that she may glide up on to the ice and use her weight for breaking purposes. The three screws are protected from floating ice by the special construction of the stern. Her first voyage was made in the winter of 1898-9, when she steamed through the Baltic to Cronstadt, crushing the ice with ease. Another ice-breaker, the *Montcalm*, is now working above Quebec, and it is expected that as a result navigation to Montreal will be opened three weeks earlier than usual.

Iceland, a Danish isl. in the North Sea, close to the Arctic Circle. It lies about 500 m. N.W. of the Shetland Islands, and 250 m. S.E. of Greenland. The area is nearly 40,000 sq. m., of which probably only 7,000 sq. m. are habitable. The N., E., and W. shores are much indented by

fjords. Iceland is a land of ice-covered plateaus, and the average height of the surface is from 1,500 to 2,000 ft. There are numerous lakes, mostly small; many are crater basins and moraine lakes. The glacier fields of Iceland cover over 5,000 sq. m., and large areas of the interior are covered with lavas of recent origin. There are many volcanoes, of which at least twenty have been in eruption in modern times. The best known are Hekla, Katla, and Askja. Over seventy earthquakes have occurred within the last century. Hot springs are numerous, and the geysers are famous for their

themselves into a sort of aristocratic republic of franklins, whose central authority was the Althing, or national assembly, which met every summer, and was at once framer, interpreter, and executor of the laws. But internal conflicts led (1262-71) to the island falling under the supremacy of the kings of Norway. From about 1280, though *de jure* only from 1388, Iceland was a dependency of the Danish crown. The restoration of national self-government, though still under the control of the Danish crown, was secured in 1902, when the governor trans-

almost precisely the same as that spoken and written at the date of its colonization in the 9th century—i.e. the ancient *Norrœna* (Northern) or Danish tongue, which presents close affinities to Anglo-Saxon, and which, the sagas state, was readily understood not only throughout the Scandinavian countries, but also in England. The language employed in the runic monuments was also closely akin to ancient Icelandic.

The literature, like that of Norway, counts two periods of especial fruitfulness—the first from about the middle of the 11th



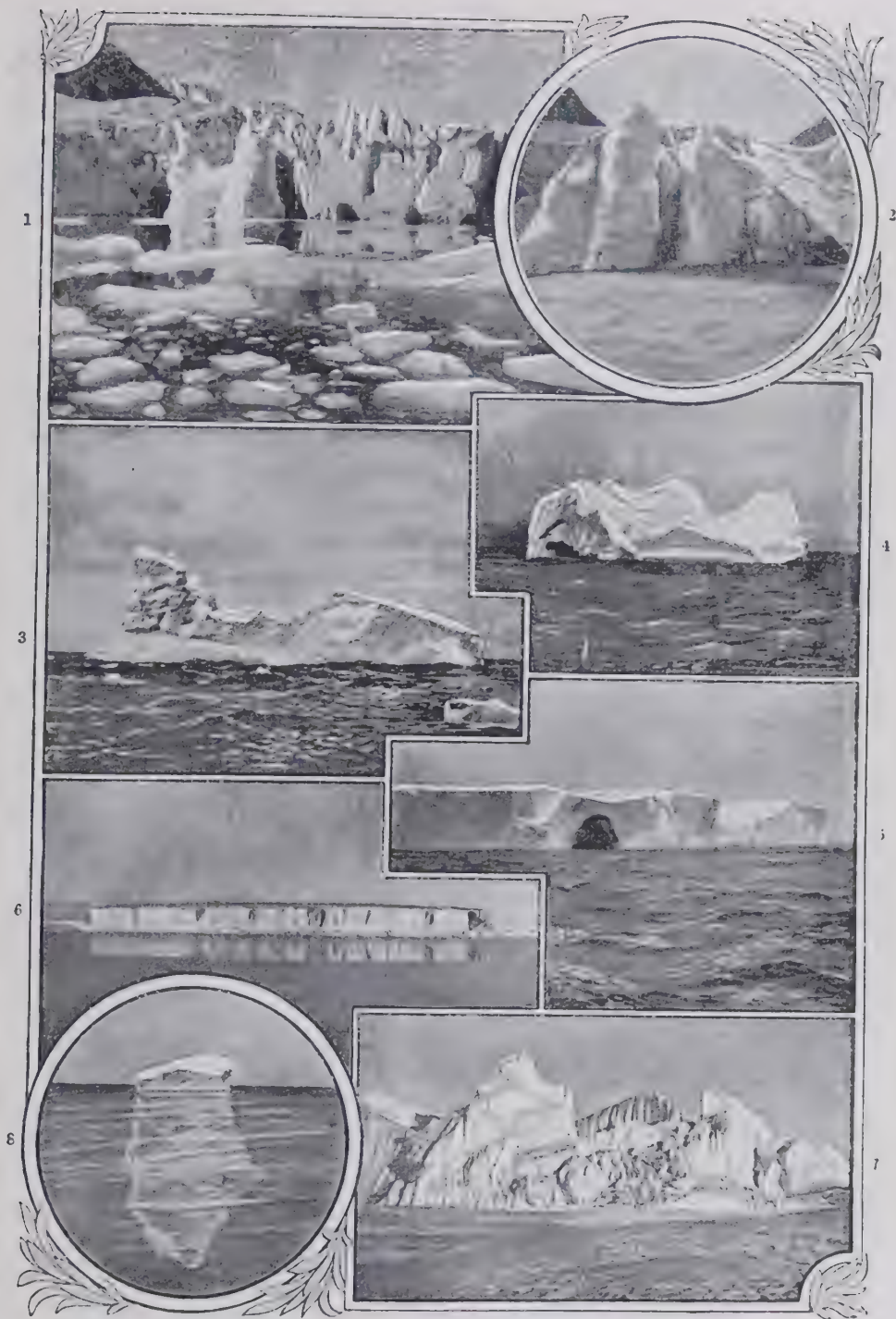
The Russian Ice-breaker 'Ermak' or 'Yermak,' built on the Tyne in 1898.

intermittent eruptions of scalding water. The scenery of the island is of great natural beauty. Iceland was discovered and colonized by Norsemen, or Scandinavian vikings, between 870 and 950, though Irish (Culdee) monks would appear to have visited the island, and partly settled there, from the year 795 onwards. The earliest immigrants arrived in four main streams—the first and fourth from Norway, the second from the Norse kingdom of Dublin, the third from the Orkneys and Western (i.e. Hebridean) islands. Christianity became established about 1000. At first the Icelanders constituted

ferred his headquarters from Copenhagen to Reykjavik, the capital of Iceland. In the spring of 1905 arrangements were made for the establishment of cable communication between the Shetland Islands and Iceland. The exports in 1903 amounted to £187,000, and the imports to £113,500. The principal exports are salt fish, especially cod, to Spain, the Mediterranean, and the United Kingdom, cod-liver oil and dairy products to the United Kingdom. Pop. (1901) 78,470.

Language and Literature.—The language spoken and written in Iceland at the present day is

to the end of the 13th century, and the second from the beginning of the 19th century to the present time. The literature of the older period admits of being grouped in three divisions—the ancient mythical and heroic songs, the scaldic poetry, and the sagas. The most valuable of the mythic or mythological songs are the *Völuspá*, or 'Wise Woman's Prophecy,' *Hamarsheimt*, or 'Fetching Home the Hammer,' *Hymiskvida*, or 'The Song of Hymir,' *Vafthrúdnismál*, or 'Sayings of Vafthrúdnir,' *Grimnismál*, or 'Sayings of Grimnir,' *Hávamál*, or 'The Saying of the High One,' and the fragmentary *Rígs-mál*—in



Icebergs.

1. Foot of glacier breaking up into small bergs. 2. Foot of glacier in shallow water. (Photo by Valentine & Sons.) 3, 4, 5. Atlantic icebergs. 6. Typical antarctic iceberg. (Photo by Dr. von Drygalski.) 7. Iceberg with sand and gravel. (Photo by Dr. von Drygalski.) 8. Diagram illustrating proportions of iceberg in and out of water.

which the doings of the gods Odin, Thor, etc., are sung. The most famous writers of scaldic poems were the grim fighter Egil Skallagrímsson (904-990), whose lament for his son contains remarkably fine poetry; Eyvind (c. 910-995 c.), the skald of Hakon the Good, king of Norway; Kormak (c. 937-967); Hallfred the Troublesome (c. 968-1014); and Sigvat Thorardson, the friend of St. Olaf and Magnus, kings of Norway. But it is the prose saga which is the peculiar and crowning product of Icelandic genius. Out of the host of sagas written in this period it must suffice to mention a few. Of a mythical-heroic cast are the *Gylfaginning*, *Völsungasaga*, *Ragnar Lodbrok*, *Hrólfr Kraka*, and *Orvar Odd*; while the following have a historical foundation: *Ynglinga*, *Orkneyinga*, *Færeyinga*, *Laxdæla*, *Eyrbyggja*, *Gretti*, *Egill*, *Viga-Glum*, *Kormak*, *Gisli*, *Njal*, and *Gunnlaug*. The chief sources for this ancient Icelandic literature are two collections known as the *Elder Edda* and the *Younger Edda*. The latter was put together by Snorri Sturluson (1178-1241) about 1222, and embraces the mythical-heroic sagas. The *Elder Edda*, which preserves the ancient mythical songs, was attributed (though upon the slenderest grounds) to Semund, who flourished about 1100, though the oldest existing ms. has only been known since 1643. Ari, a contemporary of Semund, wrote chronicles (*Konungabók*) and a wonderful Domesday Book of Iceland (*Landnámabók*). Snorri Sturluson also compiled the chronicle known as *Heimskringla*, or 'Story of the Kings of Norway,' and as a chronicler had a worthy successor in his own nephew, Sturla Thorardson (1214-84). The relatively barren stretch between the earlier and the later literary periods can only furnish the names of three poets—Stefan Olafsson (1620-88), Hallgrímur Petursson (1614-74), and Eggert Olafsson (1726-68); the ecclesiastical historian Finnur Jonsson (1704-89), who, however, wrote in Latin; and the general translator (e.g. of *Paradise Lost*) Jon Thorlaksson (1744-1819). The pioneers of the later reawakening were the last named, for he also wrote original poems, Sigurdur Petursson (1759-1827), Benedikt Gröndal (1762-1825), and Magnus Stephensen (1762-1833). The real awakening took place between 1830 and 1880, the most potent organ being the magazine *Fjölmið* (1835, etc.), to which poems, new both in form and in subject, were contributed by Bjarni Thorarson (1786-1841) and Jonas Halgrímsson (1807-45), both steeped in national feeling, and the latter

excelling in descriptions of scenery and in finish of style. They had a very useful ally in the philologist Konrad Gíslason (1808-91). Sigurdur Breiddfjörð (1798-1846), Steingrímur Thorsteinsson (1830), and Matthías Jochumsson (1835) have written poetry more or less in the same spirit, but have been succeeded by a younger school with more modern and realistic tendencies, represented by Páll Olafsson (1827), Hjalmar Jonsson (1796-1875), the younger Benedikt Gröndal (1826), Thorsteinn Erlingsson (1858), and Hannes Hafstein (1861). The two most distinguished novelists of the 19th century were Jon Thoroddsen (1819-68), his most popular book being *Pítur og Stúlka*, minutely detailed pictures of Icelandic domestic life; and Gestur Pálsson (1852-91). Einar Hjörleifsson (1859) and Jonas Jonasson (1856) also wrote novels. Outside the bounds of pure literature the most distinguished names are those of Jon Sigurdsson (1811-79), historian and political writer; Finnur Magnússon (1781-1847), Guðbrandur Vigfússon (1827-89), Sveinbjörn Egilsson (1791-1852), and Konrad Gíslason (1808-91), all philologists; the folklorist Jon Arnason (1819-88); and Thorvaldur Thoroddsen (1855), who has explored Iceland, and written extensively about her geography.

See Schweitzer's *Geschichte der Alt-skandinavischen Literatur* (1885); V. Gudmundsson's *Islands Kultur ved Aarhundredsskiftet 1900* (1902); J. C. Poestion's *Isländische Dichter der Neuzeit* (1897); Vigfússon and Powell's *Corpus Poeticum Boreale* (1883); *The Saga Library*, by W. Morris and E. Magnússon (1891-5); *The Story of Grettiur the Strong*, by the same (new ed. 1901); *The Story of Egil Skallagrímsson*, by W. C. Green (1893); *Færeyinga Saga*, by F. York Powell (1896); *The Saga of Olaf Tryggvason*, by J. Septon (1895); *Saga of Burnt Njal* (new ed. 1900), *Story of Gisli the Outlaw* (1866), and *The Prose or Younger Edda* (1842), all by Sir G. W. Dasent; *Nordiske Fornitids Sagaer*, in modern Danish, by C. C. Rafn (1829-30); and Vigfússon and Powell's *Originæ Islandicæ* (1905). See also EDDA.

Iceland Moss (*Cetraria islandica*), a lichen found in mountainous regions of N. Europe and elsewhere. In Iceland the plant is ground with flour and added to soups, which it thickens and enriches with starch. It has a bitter taste, which may be removed by soaking it in a dilute solution of sodium carbonate. The decoction may be fermented, and alcoholic liquor produced, from which a spirit can be obtained by distillation.

Iceland Spar is a clear, transparent, colourless variety of calcite, CaCO_3 , found in Iceland; sp. gr. 2.7, h. = 3. It is pre-eminently suited for optical purposes, particularly in polariscopes and Nicol's prisms. Unfortunately the supply is nearly exhausted, and the spar is now rare and costly. No substitute for calcite which can at all compare with it has been found. Its very strong double refraction and perfect transparency are unequalled among minerals.



Iceland Moss.

Iceni, an ancient British people, who dwelt in the modern counties of Suffolk and Norfolk. They revolted against the Romans under their queen Boadicea. Their chief town was *Venta Icenorum* (Caistor), near Norwich.

Ice-Plant (*Mesembryanthemum crystallinum*), a procumbent plant covered with glittering spots. All through the summer it bears white, axillary flowers close to the stems. It is easily grown as a half-hardy annual in any well-drained soil, but it must have plenty of sunlight.

Ice Sailing. See YACHT.

Ichang, treaty port in Hu-peh, China, on l. bk. of Yang-tse-kiang, 965 m. from the sea, and 10 m. below the Ichang gorges. Steamers of light draught run to and from Hankow. Ichang is the transshipment port for cargo to and from Sze-chuen. Its own produce is small, except in oranges, lemons, pumelos, quinces, and other fruits. The value of the total trade has averaged for some years over £3,000,000—in 1904, £5,312,412, of which £5,093,214 were for imports, and £219,198 were for exports. Pop. estimated at 40,000.

Ich Dien (Ger. 'I serve'). This motto, surmounted by three ostrich feathers, is the cognizance



ICELAND

Scale in Miles
0 20 40 60

of the Princes of Wales, since the time of Edward, the Black Prince.



The Cognizance of the Prince of Wales—"Ich Dien."

Ichneumon, or EGYPTIAN MONGOOSE (*Herpestes ichneumon*), a civet-like animal, found in Africa north of the Great Desert, Southern Spain, Asia Minor, and Palestine. From tip of snout to extremity of tail it measures about three feet. The coat is of a gray-brown colour, the tip of the tail being black. Formerly one of the Egyptian sacred animals, it is still domesticated and protected on account of its antipathy to snakes, and the habit of feeding largely upon the eggs of the crocodile. See MONGOOSE.



Ichneumon.

Ichneumon-flies are hymenopterous insects. Over twelve hundred species are known to inhabit Britain, and there is much variation in size, the handsome species of *Rhyssa* and *Thallessa* having ovipositors from three to four inches in length, while other forms are exceedingly minute. One example is *Microgaster glomeratus*, a minute form which is parasitic during larval life upon the caterpillar of the garden white or cabbage butterfly (*Pieris brassicae*). The adult bores through the skin of the caterpillar by means of its ovipositor, and



Ichneumon-fly.

so introduces its eggs into the subcutaneous tissue. These eggs develop into minute maggots, which feed upon the reserves

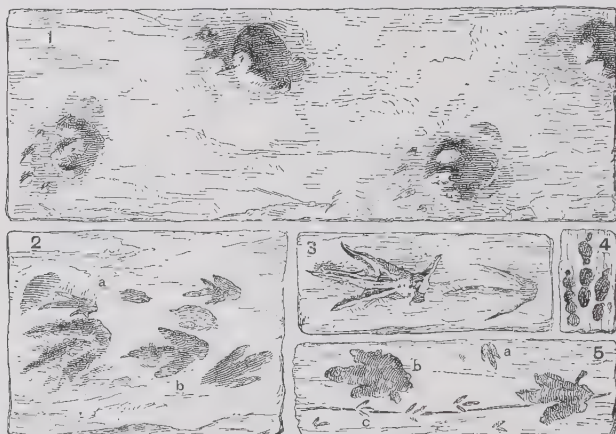
accumulated by the caterpillar in its fat body, and when the time approaches at which the latter would normally be full-fed and ready to pupate, it shows signs of sickness, in consequence of the using up of its whole reserve of food. The parasites now quit their host, and, spinning cocoons of silk, pupate within them, to emerge later as adult ichneumons. Meanwhile the host dies either before pupation or within its pupa case. In some other ichneumons the larvæ pupate within the cocoon of the host, and then emerge from this as a crowd of minute black flies, the expected butterfly not emerging at all.

The fine species of *Rhyssa* and *Thallessa* are parasitic upon the larvæ of wood-eating saw-flies, such as *Sirex*. The latter live within solid wood, and the ichneumons bore through the wood to the

Sir William Jardine's *Ichthyology of Annandale* (1853); also Hitchcock's *Ichthyology of New England* (1888), and Hutchinson's *Extinct Monsters* (1892).

Ichor, a word used by Homer to signify the ethereal fluid, not blood, which flowed in the veins of the gods of Olympus. In later Greek it meant the watery part of animal juices, equalling the Latin *serum*, as of blood, of gall, of milk, or the juice of leaves, and even a discharge of poisonous matter.

Ichthyodorulites are fossil fish-spines, mostly belonging to extinct species of sharks. Some were planted along the ridge of the back; others were in front of the breast fins. Similar spines are seen in the living dog-fish. The largest are from two to three feet in length. Many are known from the Carboniferous; but it is often uncertain to what species they



Ichthyology: Specimens of Fossil Footprints.

1. *Chilichnus ambiguus*. 2. a, *Palmetus Clarki*; b, *Brontozoon*. 3. *Trianopus leptodactylus*. 4. *Grallator cursorius*. 5. a, *Gigantitherium caudatum*; b, *Tridentipes uncus*; c, *Chelonoides incedens*. (Adapted from Jardine and Hitchcock.)

burrow of the *sirex* larva, where the egg is deposited. The resulting larva attacks the *sirex* larva, and lives on it as an external parasite. Ichneumon-flies may be distinguished from true flies by the pushed from two pairs of wings, no less than by the structure of the mouth.

Ichthyology, the study of fossil footprints. These are most common in the Permian and Triassic strata, where large slabs of rock are often covered with impressions of the feet of reptiles or amphibians, which walked over the soft muddy sand when it was wet. The next tide or flood brought with it sediment, which buried the indented surface and preserved it. Often we know nothing about the animals which produced them, as none of their remains have come to light. See

belonged, as the internal skeleton rotted away. The earliest fish-spines are found in the Upper Silurian.

Ichthyology, the science of FISHES.

Ichthyornis, an extinct toothed bird, which had a row of reptile teeth in each jaw. Its remains have been found in the middle Cretaceous of Kansas, and indicate that it was about a foot in height. Its anatomical characters indicate that it was a bird of strong flight. Except for the presence of teeth, the structure of the head is remarkably birdlike. The terminal vertebrae of the spinal column are fused together to form a pygostyle, and the tibio-tarsus is thoroughly avian. There is nothing to indicate degeneration, as in *Hesperornis*, and it is quite as far removed from the primitive

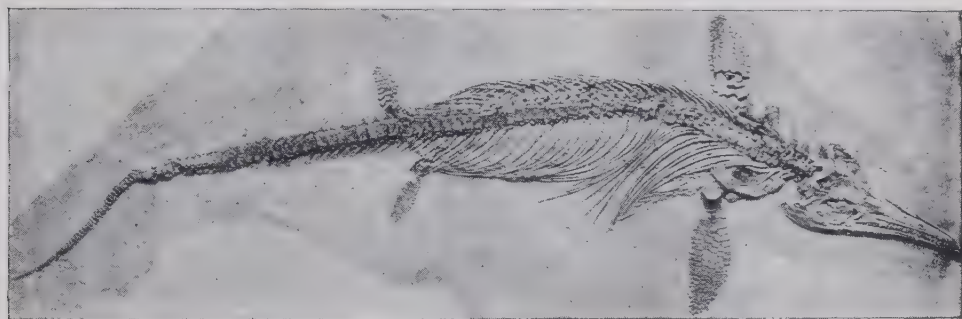
Archæopteryx; but the bodies of the vertebræ are all 'amphicoelous'—that is to say, they have a cup-shaped hollow both in front and behind, a link with the reptiles. Two or three species are known. They were all predaceous and carnivorous.

Ichthyosaurus, a genus of fossil reptiles, which sometimes attain a length of thirty feet. The animal was very like a fish or a porpoise. A long, pointed head, with jaws armed with rows of formidable teeth, passed directly into the fusiform body, as the animal had practically no neck, like existing whales. The body tapered behind to a bifurcate tail, which resembled that of fishes rather than of the Cetacea, as its plane was vertical, and not horizontal. The pectoral and pelvic fins showed none of the digits externally, but were converted into swimming fins or flippers, encased in smooth skin,

paddle, flexible and tapering slightly to its junction with the body. The tail was comparatively short, and the terminal vertebræ passed into the lower lobe, a curious and unique feature. The numerous conical teeth were firmly fixed in a single row in a groove along the under side of the jaw bones. Around the eyes there were circles of sclerotic plates. The vertebral bodies are concave in front and behind, like those of fishes, and all the joints of the vertebral column, except those of the tail, bore ribs on each side. The two anterior vertebræ are usually fused together—a feature which recalls the similar structures in the whales. The pelvis is weak, and is not directly attached to the spinal column, having been united to it apparently only by ligaments, and not by articulation. The pectoral arch, however, is more robust, and has the usual bones.

form spines of varying length and thickness. Xeroderma is a form of ichthyosis in which dryness of the skin is the most conspicuous feature. But all forms alike are characterized by defect in the oily secretion of the skin and by a lack of the subcutaneous fat, in consequence of which the skin loses its normal transparency and lustre, and often exhales an unpleasant odour. In treating ichthyosis, an effort should be made to improve the general health of the body by liberal diet, cod-liver oil, and tonics. Locally the hardened epidermis should be softened and removed by shampooing and Turkish baths, and the innervation and circulation of the skin should be stimulated by friction and inunction of oils and stimulating liniments.

icilius, SPURIUS, a plebeian of early Rome. He was tribune in 456 and 455 B.C., and in 449 defended the cause of Virginia,



Ichthyosaurus intermedius.

resembling the pectoral fins of whales. Along the ridge of the back there was one prominent dorsal fin, supported by fin rays, and placed opposite the middle of the body. Behind this was a row of smaller, less substantial fins, only preserved in a single specimen from Württemberg (1892). They were six or seven in number, more or less completely separate, and occupied the space between the dorsal in front and the tail fin behind. The similarity to whales extends even to minute details of the external form; and this is a remarkable example of convergence between two distinct races, the reptiles and the mammals, as a result of the adaptation to an aquatic mode of life.

The bones of the skeleton show how profoundly the usual type of reptile structure had been modified in these creatures. In the limbs the humerus remained, but all the other bones had been converted into polygonal ossicles which fitted closely together to form a flattened, oar-shaped

The animal was apparently carnivorous, and fed on fishes and molluscs. These reptiles were probably viviparous. Remains of the ichthyosaurus are found in Rhætic, Jurassic, and Cretaceous strata in Europe, Australia, Africa, and S. America. The ichthyosaurs were all marine, and were so numerous that their bones and coprolites have furnished extensive supplies of phosphate of lime for the preparation of artificial manures. About twenty different species are known.

Ichthyosis, a skin disease, in which the surface of the skin is dry, hard, rough, and grayish in colour, and the upper layers of the epidermis are shed in scaly fragments. The disease is sometimes congenital and hereditary, and its manifestation and extent are often determined by want of cleanliness and by improper food. Several varieties are described, such as *I. reticulata*, in which the lines between the scales form a prominent network; *I. spinosa*, in which epidermis and sebaceous material

his betrothed, against the decemvir Appius Claudius; and when at length she was slain by her father, Icilius raised an army and overthrew the decemvirs.

Icknield Street (*Via Iceniana*), one of the Roman roads of Britain, which is supposed to have run from Norfolk to Cornwall.

Icolmkill. See **IONA**.

Iconium (modern *Konieh*), ancient city in Asia Minor, situated on the principal military and commercial highway. Under Roman rule it was the capital of Lycaonia, and was three times visited by Paul and Barnabas (Acts 13:51; 14:1-6; 14:21). A synod of the church was held there in 235 A.D. Iconium fell into the hands of the Seljuk Turks in 1074, and in 1097 was made the capital of their kingdom. The town played a prominent part in the crusades, being occupied by Godfrey of Bouillon, and by Frederick Barbarossa (1190). Here Ibrahim Pasha of Egypt defeated the Turks in 1832. It manufactures woollen goods, carpets, and leather, and

is the seat of a Greek archbishop. Pop. 44,000.

Iconoclasts. See IMAGE-WORSHIP.

Icosahedron. See POLYHEDRON.

ICTINUS (c. 450 B.C.), Athenian architect, who flourished during the 'age of Pericles.' With Calliocrates he designed the Parthenon at Athens; it was completed in

judgment of Paris, and (in Homer) the place from which the gods watched the battles between the Trojans and Greeks. It was intimately connected with the worship of Cybele. It is now known as the Kaz Dagh (highest point, 5,750 ft.). (2.) A mountain in the centre of Crete (8,000 ft.). It was associated with the worship of Zeus, whose birth was be-

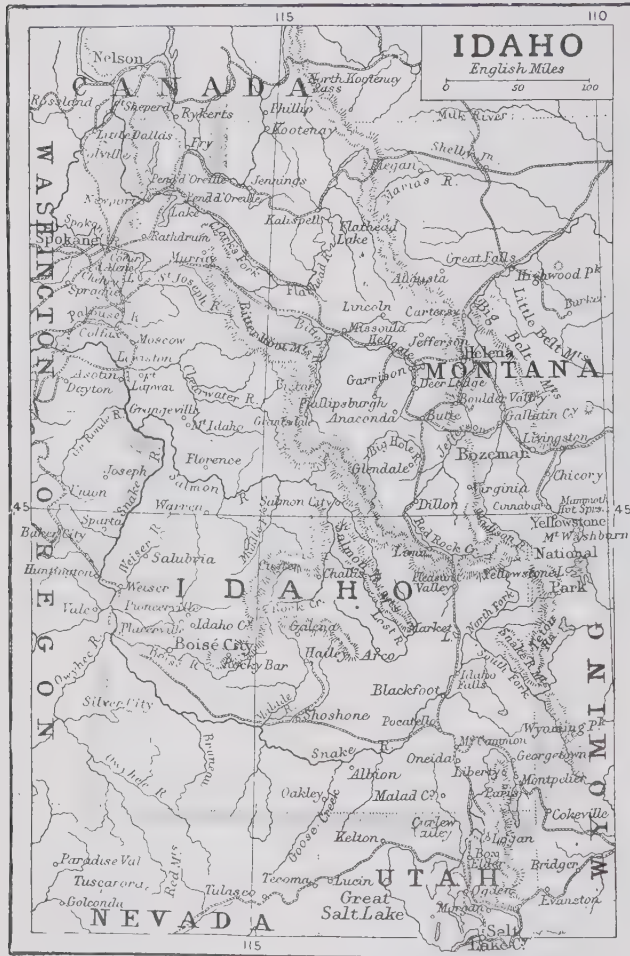
States of America, with an area of 84,800 sq. m. It was organized as a territory in 1863, and admitted as a state in 1890. Lying within the Rocky Mountain region, its central and northern parts are traversed by many mountain ranges, with narrow valleys, while the southern part is, in the main, a great lava plain. Around this great plain flows Snake R., one of the two main branches of the Columbia. In its northward course along the w. boundary of the state it receives the waters of the Salmon and Clearwater Rs. from the interior. The capital and chief city is Boise. Lying in the main within the arid region, the agriculture is chiefly dependent for success upon irrigation. Idaho stands first in the production of lead in the United States, fourth in silver, and ninth in gold and copper. In 1904 the gold production amounted to \$691,166; silver, commercial value, \$985,742; lead, 101,000 tons, valued at £1,945,885; and copper, 2,420 tons, valued at £140,992. Pop. (1900) 161,772.

Idalium, ancient tn., Cyprus. Adjoining it was a temple sacred to Aphrodite, from which the goddess was sometimes called Idalia. Its site is occupied by the modern Dali, where was discovered in 1868 a bilingual inscription (Phœnician and Cypriote), from which the ancient language of Cyprus was first ascertained to be a dialect of Greek. See *Cyprus Museum Catalogue* (1899) for discoveries made at Dali since 1894.

Idar. See EDAR.

Idas, in ancient Greek legend, was the brother of Lynceus; his home was in Messenia. He loved Marpessa, whom the god Apollo also wooed; and when Zeus bade Marpessa choose her husband for herself, she chose the mortal. Idas and Lynceus also figure in the hunt of the Calydonian boar and the expedition of the Argonauts; but their most famous exploit was their fight with Castor and Pollux: Idas slew Castor, but Lynceus was slain by Pollux; then Idas wounded Pollux, but was slain by Zeus with a thunderbolt. Their tomb was shown at Sparta in the time of Pausanias.

Iddesleigh, SIR STAFFORD HENRY NORTHCOTE, FIRST EARL OF (1818-87), English statesman, was born in London. In 1842 he became private secretary to Mr. Gladstone at the Board of Trade. He entered Parliament as a moderate Conservative for Dudley (1855), was elected for Stamford (1858), and was appointed financial secretary to the Treasury (1859), President of the Board of Trade (1866), and Secretary of State for India (1867). Northcote was one of the commissioners for



438 B.C. Ictinus was also the architect of the beautiful temple of Apollo Epicurius at Bassæ (near Phigalia in Arcadia), and of the shrine at Eleusis in which the mysteries were celebrated. In conjunction with Carpinion he wrote a description of the Parthenon. See Pausanias, viii. 41, sec. 5.

Ida. (1.) A mountain range in Mysia, Asia Minor, the scene of the rape of Ganymede and of the

lieve to have taken place in a cave within it. Its modern name is Psiloriti.

Ida (d. 559), first king of Bernicia, began to reign in Northumbria in 547. Under him and his sons there was a widespread apostasy from Christianity among the Picts. Ida is said to have fallen in a battle against the Britons.

Idaho (abbreviated Id.), one of the w. states of the United

the settlement of the Alabama claims (1871). On the return of his party to power (1874) he became Chancellor of the Exchequer, and distinguished himself by the introduction of the sinking fund for the reduction of the national debt. On Disraeli's elevation to the peerage (1876), Northcote succeeded him as leader of the Commons. He was created Earl of Iddesleigh (1885), and the same year became First Lord of the Treasury. In Salisbury's (1886) administration he was Foreign Secretary, but resigned in December of that year. He was the author of *A Short Review of the History of the Navigation Laws* (1849), *Twenty Years of Financial Policy* (1862), and *The Lectures and Essays* (1887). See *Life* by Andrew Lang (1890).

Idea. As used by Plato, the term is the metaphysical equivalent for the concept or definition, on whose importance in philosophy his master Socrates laid so much stress in ethics. In contrast with the sensible and particular thing or phenomenon, which is apprehended by ordinary perception, the idea is thus supersensible, and belongs to a higher order of reality, an intelligible world, apprehended by thought. (See PLATO.) In modern philosophy the term was used, at first by the Cartesians, and thence onwards till the time of Kant, in the psychological sense from which the popular use is derived, and which has remained, with some modification, the prevalent sense of the term in English philosophy. Thus Locke, at the outset of his essay, proposes to use it as 'being the term which serves best to stand for whatsoever is the object of the understanding when a man thinks,' or, as we should now say, the general term for any object of consciousness as such, whether a percept, image, or concept. By Hume, however, the term impression was employed to denote direct perceptions or sensations, and idea was used only for the memory images which may be formed from these, and by means of which thought works. And this usage of idea has tended to prevail in scientific psychology as well as in popular language. By Kant the term idea was used to signify the highest concepts of reason—concepts which, though incapable of being verified as realities in experience, on account of the limited and phenomenal nature of the latter, nevertheless regulate our thinking as ideals of unity or completeness. (See KANT.) In the thought of his great idealistic successors the usage of the term passed over into one which was practically a re-

vival of the original Platonic use. (See HEGEL.)

Idealism is a term of very wide, varied, and loose application. Popularly, it is opposed to materialism in science, and to realism in art and literature, and then signifies a regard for and insistence upon a higher and more spiritual view of the world and of life, in opposition to those who see only the more material side of reality and the baser side of life, those who in science admit only physical existences and causes, and who in art and literature lay great stress upon the lower and coarser elements in human nature. Even in philosophy the term is used in a very vague and fluctuating fashion; but the main usages are two, a metaphysical and a psychological (or epistemological), corresponding to what may be called the Platonic and the psychological usages of the term idea. In its metaphysical usage idealism is the term applied to philosophies like those of Plato and Hegel, which maintain the world to be in its most ultimate nature intelligible or spiritual. In its psychological or epistemological usage the term is applied to a doctrine like that of Berkeley, which regards the external world as existing only for and in the consciousness of individual percipients, while the opposing doctrine of realism asserts the independence of the external world upon the percipient subject. This latter kind of idealism is sometimes termed subjective, and contrasted with the former, which is called absolute idealism. For the expression 'transcendental idealism,' see KANT.

Identity. The philosophical question of the meaning of identity has three phases according as it relates to (1) the logical formula or law of identity; (2) the metaphysical concept of the identity of a thing; (3) the special psychological form which this concept takes in the case of a conscious being or person, the problem of personal identity. (1.) The logical law, for which the customary formula is $A=A$, is best understood as simply the positive form of that axiom of consistent thinking which the law of contradiction states negatively—*viz.* that a judgment cannot be now true, now false; but if it is true at all, it must remain true always: for if the truth of a judgment fluctuated (without any change in the subject-matter of the judgment), all thinking would be brought to confusion. (2.) The metaphysical discussion of identity is concerned with questions such as these: the various senses in which identity can be predicated; the distinction of nu-

merical identity from qualitative likeness; the relation of identity to difference, whether it excludes difference, or, on the contrary, implies it; etc. Such questions are no doubt partly verbal and partly psychological, but they also lead back to very fundamental problems of philosophy. (For a brief introduction to such problems, see an essay on 'The Philosophical Importance of a True Theory of Identity' in Bosanquet's *Essays and Addresses*; (1889). (3.) The psychological problem of personal identity was raised into prominence by Locke's somewhat paradoxical discussions in his *Essay concerning Human Understanding*, bk. ii. ch. xxvii., with which compare Butler's dissertation appended to the *Analogy*—discussions which Hume, in his *Treatise on Human Nature* (new ed. 1896), followed up with an analysis on the lines of his sceptical philosophy. The abstract difficulties of the notion of personal identity, which appear in these early discussions, are complicated in modern psychology by the more concrete difficulties raised by cases of double or alternating personality. See, for a modern view of the psychological problems, James's *Psychology* (1890), vol. i. ch. x.

Idea. See CALEND.

Idiocy, a term embracing a group of disorders due to arrest in the development of the brain. This developmental arrest is manifested by abnormalities in the mental, moral, and physical condition of the patient. In the more profound degrees of idiocy the higher mental faculties are altogether absent, the special senses are often defective, and the bodily organs and tissues are generally malformed, ill nourished, and functionally weak. When the mental impairment is but slight, the term imbecile is often applied to the patient; but no accurate distinction can be drawn between idiocy and imbecility, the difference being one merely of degree. Idiocy is often classified as (1) congenital, in which mental defect is manifest at birth; (2) developmental, in which a child of average brain power at birth displays mental insufficiency at a later period; and (3) accidental, in which a child at first of normal development becomes idiotic or imbecile after a traumatism, or after diseases such as tubercular meningitis and epilepsy. Under accidental idiocy must be placed cretinism. Congenital cases are sometimes characterized by microcephaly (smallness of the head), sometimes by macrocephaly (inordinate size of the head), and sometimes by hydrocephaly, in which the ventricles

of the brain are distended by serous fluid. The ultimate causes of idiocy often lie in ancestral defects; and parental alcoholism, consanguinity, struma, neurosis, and constitutional debility from various causes, are the forerunners of innumerable developmental aberrations in the progeny. After birth the gradual unfolding of the childish mind may be arrested at one of the developmental crises, such as those of the first and the second dentition and that of puberty.

In a typical case of idiocy the stature is defective, and the patient is often adipose, the skin is dry and coarse, the muscles are weak and flabby, while the bones are frequently deformed. The circulatory, respiratory, and digestive systems show impairment of function, and offer but feeble resistance to the attacks of disease. The reproductive system is generally abnormal, and vicious and dirty habits frequently exist along with sterility. In many cases speech is defective, the various malformations of the palate and mouth contributing to this result. The impairment of the mental functions is marked chiefly by defective memory, by lack of observation and concentration, and by weakness of reasoning power, imagination, judgment, and self-control. Such patients often display a great liking for music, which sometimes has a strange power of fixing their attention and soothing their passions. Treatment should be carried out in a suitable school or asylum, where skilled teachers, by unwearied patience and kindness, can often instil habits of cleanliness, neatness, truthfulness, and obedience. The most careful attention must be paid at all times to the general health of the patient. Specially prepared foods are frequently necessary, on account of malformations which render mastication difficult or impossible.

Idiosyncrasy, in medicine, implies a constitutional peculiarity whereby an individual reacts to a stimulus in an abnormal or unusual way. Some persons are rendered deaf and giddy by even a minute dose of quinine; others develop skin eruptions after certain foods (shellfish are notorious in this respect), or after contact with certain plants like *Primula obconica*. Hay asthma is an idiosyncratic hypersensitiveness to certain pollens. The odour from various flowers induces faintness or sickness in some individuals, while the sight or smell of certain animals causes similar distress. One of the greatest of living soldiers cannot tolerate proximity to a cat, even if the animal be unseen. The more marked manifes-

tations are found chiefly in persons of neurotic type. In some cases they can be overcome; but most patients with an idiosyncrasy should be discreet rather than valorous, and as far as possible should shun their 'pet aversions.' Children should never be forced to eat anything to which they consistently, though irrationally, object.

Idle, par. and tn., W. Riding, Yorkshire, England, on riv. Aire, 3 m. N.E. of Bradford, within whose boundaries it was included (1899). It is engaged in the woolen trade. Pop. (1901) 7,468.

Idocrase, or **VESUVIANITE**, is an aluminium calcium silicate which is common in crystalline limestones, especially when they have been impure, and have recrystallized owing to contact with intrusive igneous masses. The crystals are tetragonal, and often show a large number of faces; sp. gr. 3.4. Its hardness (nearly 7), its vitreous to resinous lustre, colour (brown to green), and imperfect cleavage, give it a close resemblance to garnet, for which it is often mistaken. Very fine specimens are obtained in Siberia, Piedmont, and Norway. It has derived its name from its frequency in the ejected blocks of Vesuvius. It is cut and polished for rings, etc., and not infrequently passes into the hands of purchasers under the name of chrysolite, jacinth, or jargon.

Idolatry, the worship of idols or images believed to represent the deity or other supernatural beings. It was formerly maintained that idolatry was a degenerate form of the true worship, but recent investigation rather tends to show that it is a stage in the development of religion, and by no means one of the earliest. Its most probable origin is fetishism; but whereas in fetishism the god is little better than a tool in the hands of the man, in idolatry the deity is regarded as the superior. Such a process of development must meanwhile remain more or less conjectural, logical rather than psychological or historical. Idolatry was an essential element in the cults of Egypt, Greece, and Rome, while it is absent from many less developed religions, as, for example, the Hottentot and the Eskimo. It seems to have been widely disseminated in the primitive Semitic world, and relics of it are to be found probably in the teraphim of Jacob and David (Gen. 31:19, 34; 1 Sam. 19:13). A more persistent vestige of idolatry among the Israelites was their tendency to relapse from monotheism into a lower stage, as witness the making of a golden calf by Aaron (Exod. 32) and by Jeroboam (1 Kings 12:28), the

setting up of Ashēroth (wrongly 'groves,' 1 Kings 14:15, 23) and the readiness to embrace such foreign deities as Achtoresh and Baal (1 Kings 11:5; 16:32). The unseen Jehovah was too high and elusive a conception for the common man among the Hebrews, and till after the captivity there was a constant tendency, not only to substitute for Jehovah less worthy ideas of the Godhead, but also to fashion some visible and tangible representation either of these lower deities or of Jehovah Himself. As an evidence of the enduring power of 'the graven image' may be instanced the veneration of images of the Virgin and the saints in the Roman Catholic and Greek churches to the present day. (See **IMAGE-WORSHIP**.) The reformed churches utterly eschew idolatry, but the Lutheran still admit of images by way of ornament, or as helpful to devotion. See E. B. Tylor's *Early History of Mankind* (3rd ed. 1878); *Primitive Culture* (4th ed. rev. 1903); Sir John Lubbock's *Origin of Civilization* (1902); also **IMAGE-WORSHIP**, and works cited at **RELIGION**.

Idomeneus, king of Crete, son of Deucalion, was the captain of the Cretans in the Trojan war. Post-Homeric traditions tell that in a storm he vowed to sacrifice to Poseidon whatever he should first meet on landing: this was his son, whom he accordingly sacrificed. But as a plague visited the island in consequence, he was expelled, and settled first in Calabria in Italy, and afterwards near Colophon. His tomb, however, was shown at Cnossus in Crete.

Idria, tn., Austrian prov. of Carniola, 75 m. by rail S.W. of Laibach; has quicksilver mines, which have been worked since the 16th century. Pop. (1900) 5,772.

Idris, a Welsh mythical figure, whose rocky seat on the summit of Cader Idris was said to have the property of conferring poetic inspiration, or else inducing madness or death. Mrs. Hemans makes the legend the subject of a poem.

Idrisi. See **EDRISI MOHAMMED**.

Idumæa, the Greek form of Edom found in the Bible; but whereas the Biblical Edom extended from the Dead Sea to the E. head of the Red Sea, Idumæa in later Jewish and Roman history signifies the N. part of Arabia Petræa, and the S. part of Judæa as far as Hebron. See **EDOM**.

Idun, in Norse mythology, the goddess personifying the reviving year, keeper of the golden apples which the gods tasted to renew their youth. She was carried off by Thiassi (winter), and imprisoned in the nether world, from which she escaped again in spring in the form of a bird.

Idyll, or **IDYL**, a highly-wrought narrative poem, generally descriptive of pastoral scenes, such as the idylls of Theocritus, Bion, and Moschus. In his *Idylls of the King*, Tennyson uses the word in its original meaning of 'pictures,' select representative tableaux, as distinguished from the formal epic.

Idylls of the King.—Tennyson's poems are based upon Malory's prose compilation, and modified to suit the poet's individual conception, and consequently cannot be quoted as authority for any incident or character of the Arthurian cycle.

The Coming of Arthur.—The mystic origin ascribed to Arthur has no warrant in the original tradition, where he is always represented as the son of Uther and Ygerne. Lancelot is not, as here represented, of the same age as Arthur, but in the genuine romance is not born till long after the marriage. The Lady of the Lake has no real connection with Arthur, but only with Lancelot, whom she steals as a child and brings up in her magic kingdom. The winning of Excalibur and the war with the Romans are the only points in which Tennyson can be said to have followed any tradition. The former is found only in the *Suite de Merlin*; the latter, in one form or another, is in all the pseudo-historic versions.

Gareth and Lynette.—The original source of this story has not yet been discovered. The tale shows points of contact with the cycle of *Le Bel Inconnu*. Compare GAWAIN.

The Marriage of Geraint and Enid are based upon the *Geraint ap Erbyn* of the *Mabinogion*, accessible in Lady Charlotte Guest's translation. Both poems are in practical accordance with the original tradition.

Balin and Balan.—The original source is the *Suite de Merlin*; nor has the story, so far, been found elsewhere. It appears to be a fine variant of the widely-diffused tale of a fatal combat between two near relations, generally a father and a son. Compare *Sohrab and Rustem*, Grimm Library, No. xiv.

Merlin and Vivien.—This story is found in both versions of the *Merlin*, and was evidently told at length in a lost romance, the *Brat or Bret*, fragments of which have been found in a Portuguese translation (cf. Gaston Paris's Introduction to the *Suite de Merlin*). The identity and character of the lady vary: sometimes she is a mortal maiden, actuated only by a desire to keep her lover with her; sometimes she appears to be a supernatural being, one of the 'Ladies of the Lake,' who resents the sage's importunity, and wishes to be rid of him.

The enchantment also varies: sometimes Merlin is literally entombed alive, sometimes only imprisoned in an invisible castle. The name Vivien, or Viviane, appears to have arisen from a misreading of Nimue or Nimuen, the name borne by the 'Lake' maiden.

Lancelot and Elaine.—This story represents an incident of the latter part of the *Prose Lancelot*, or, more correctly speaking, of the *Morte d'Arthur*, now incorporated with the former romance. In the original the lady is unnamed; Malory probably gave her the name of Elaine through a confusion with Elaine, daughter of King Pelles and mother of Galahad, who also loved Lancelot.

The Holy Grail.—This practically incorporates the *Quête del Saint Graal* in its entirety. The original romance, belonging to a late stage in the evolution of the Arthurian cycle, is much inferior to the earlier *Quest* versions. Tennyson's poem is in many points a decided improvement on the source. The principal departure from the genuine tradition is in the presentment of Sir Bors (Bohort), who in the original *Lancelot* romances is considerably the junior of that hero, his confidant, and the constant messenger between him and Guinevere. Nowhere save in the *Quête* is he represented in a markedly ascetic character.

Pelleas and Ettarre.—This is drawn from the *Suite de Merlin*, and, though in a lesser degree than the *Prose Tristan* and the *Quête*, it gives a very unfavourable picture of Gawain's character. Tennyson has fallen into the error of considering Gawain, the model of knighthood and the flower of courtesy, as a mere reckless libertine—a view entirely foreign to the genuine English tradition.

The Last Tournament.—In certain versions of the *Prose Tristan* the hero is murdered by his uncle, whose character in this the latest form of the legend has undergone a grave deterioration; the original Mark is a generous and pathetic conception. Tennyson has borrowed this detail from Malory, but the remainder of the poem has no parallel in Arthurian tradition.

Guinevere.—This idyll, like the preceding, owes little to the original romance. Wace in the *Brut* tells us that Guinevere, after her betrayal of her husband with Modred, fearing Arthur's vengeance, fled to Karlion (Caerleon), where she became a veiled nun. Malory, in his concluding book, represents her after Arthur's death as taking refuge at Almesbury, where she has a final interview with Lancelot, and eventually becomes abbess.

The Passing of Arthur.—This idyll is the one which adheres most closely to the original tradition. The original is in the *Morte Arthur*, now generally found incorporated with the *Prose Lancelot*.

If, rocky islet in the Gulf of Lyons, France, 2 m. s.w. of Marseilles. The fortress, Château d'If, was built by Francis I. in 1529, and was later used as a state prison, Mirabeau and Philippe Egalité being amongst its more illustrious occupants. Dumas, in his *Count of Monte Cristo*, impresses his hero in the château.

Iffland, AUGUST WILLIAM (1759-1814), German actor and playwright, born at Hanover. After winning a great reputation at Mannheim, he in 1796 became director of the National Theatre in Berlin, and in 1811 general director of the royal Prussian theatres. Iffland was very successful as actor and as manager, and also as playwright, some of his plays being still acted. *The Lawyers*, *The Bachelors*, *The Foresters*, *The Nephews* (all in 1799), *Crime from Ambition* (1800), and *Conscience* (1801), all in English, are amongst the best. In 1798-1802 he issued his complete *Dramatische Werke*, in sixteen volumes, with autobiography (new ed. 1885), and in 1808 two more volumes were added. See Dunccker's *Iffland in seinen Schriften* (1859), and Koffka's *Iffland und Dalberg* (1865).

Ifrit, IPREET, or AFREET, a malevolent ogre in Arabic folklore.

Iggdrasil. See YGGDRASIL.

Iglau, tn., Moravia, Austria, on the Iglawa, 110 m. by rail s.e. of Prague, with a large tobacco factory, sawmills, and manufactures of cloth, plush, glass, and pottery. Here the Austrians defeated the Bavarians in 1805. Pop. (1900) 24,387.

Iglesias, episc. tn., Sardinia, Italy, stands near the w. coast, 34 m. by rail w. of Cagliari, and in the midst of lead and zinc mines. Its cathedral dates from 1285, and the town is still in part surrounded with walls, and has a citadel (1325). Pop. (1901) 20,874.

Iglesias de la Casa, JOSÉ (1748-91), Spanish poet, born at Salamanca. In 1783 he took holy orders, and was successively priest of Larodrigo and Carbajosa de la Sagrada. His poems, which were not published till 1798 (new ed. 1869), consist of ballads, apologies, epigrams, and *letrillas*. Iglesias excelled in satirical verse, and on this account is generally ranked with Quevedo. Some of his poems were put on the Index in 1802.

Igló, mining tn., Hungary, co. Szepes, 52 m. by rail N.W.

of Kaschau; produces iron and copper, stoneware, etc. Pop. (1900) 8,923.

Ignatiev, NIKOLAI PAVLOVITCH, COUNT (1832), Russian diplomatist, born at St. Petersburg. At the peace of Paris he took an active part in the negotiations regarding the rectification of the Russian frontier on the Lower Danube. In 1858 he concluded commercial treaties with the khan of Khiva. Two years later he was sent as plenipotentiary to Peking, and obtained for Russia the left bank of the Amur, and a large extent of territory. This success led to his appointment as ambassador at Constantinople in 1864, where he remained till 1877. During these years he steadily endeavoured to secure for Russia a powerful influence over Turkey, and especially over the Christian subjects of the Porte. In the negotiations before and after the Russo-Turkish war of 1877-8 he took a prominent part, and the treaty of San Stefano was mainly his work. After the war he fell into disfavour, and was recalled. On the accession of Alexander III. in 1881 he became minister of the interior, but was shortly afterwards dismissed on account of his Pan Slavist intrigues, and for allowing the persecution of the Jews.

Ignatius, bishop of Antioch, and one of the so-called 'apostolic fathers.' A fairly reliable tradition represents him as having been a pupil of the apostle John. When persecution broke out suddenly in Antioch in the reign of Trajan, Ignatius was seized and sent to Rome to fight with wild beasts (c. 115 A.D.). On his journey he received several communications from Christian churches, and by way of response wrote his famous epistles, as also one to his friend Polycarp, bishop of Smyrna. These letters have in modern times been the theme of much controversy, the point in dispute being not only the actual number to be admitted as genuine, but also their form and extent. From early times a group of fifteen so-called Ignatian epistles was known in a Latin translation, but when about the middle of the 16th century Greek copies (or originals?) of these were discovered and published, the remaining three were generally rejected as spurious; from the extent of the several epistles, this recension is known as the long form. In 1646, however, Archbishop Ussher published a shorter (Latin) recension of seven of these; and as Eusebius had given the names of this smaller group (*viz.* to Polycarp, the Ephesians, Romans, Magnesians, Philadelphians, Trallians, and Smyrneans), the longer form of the

larger group was surrendered, especially as (in 1646) Isaac Vossius was able to publish a Greek text of six of Ussher's seven, the remaining one being presently furnished by Ruinart: this is known as the middle or Vossian form. But in course of time the genuineness even of these seven was impeached, particularly by Baur and Schweigler, and the whole question was reopened in 1845 by the publication of a still shorter (Syriac) recension of three of the epistles (*Pol., Rom., Eph.*), which had been discovered by Cureton in the Nitrian Desert (the short form). To some scholars—*e.g.* Bunsen, Lipsius, Weiss—it seemed that at last the authentic kernel of the Ignatian literature had been found; while others saw in Cureton's edition but an abstract of their longer correlatives in the middle recension. The mere fact, however, of such considerable alterations having taken place (on any theory), and of the presence of suspect views in the letters themselves, has led some to abandon all as fabrications; but recent criticism, on the whole, tends to stand by the middle form of seven. The most notable advocates of this view are Zahn, *Ignatius von Antioch* (1873), and Lightfoot, *The Apostolic Fathers*, ii. (new ed. 1889). The writer urges the communities to maintain their brotherliness in the present and the coming trials, pleads for obedience to their respective bishops, and warns them against Docetism and other forms of Gnostic error. See, besides the works named above, Gebhardt, Harnack, and Zahn's ed. of *Apost. Fathers* (1877-8); Möller's *Church History* (trans. 1893).

Ignatius, FATHER (1837), whose real name was Joseph Leycester Lyne, English preacher and writer, was born in London. His efforts to restore monasticism in the Church of England led him to purchase land near Abergavenny, and erect Llanthony Abbey (1870), of which he became superior. The monks use the Benedictine breviary and the Sarum Missal of the ante-reformation Church of England, and wear the Benedictine dress. Father Ignatius during recent years has devoted much of his energy to speaking and writing in defence of the Holy Scriptures and orthodox Christianity against rationalism and the 'higher critics' in the Church of England. In 1890-1 he made an extraordinarily successful missionary tour through Canada and the United States; and in London his enthusiastic mission preaching has attracted vast crowds. See *Life* by Baroness de Bertouch (1904).

Ignatius de Loyola. See LOYOLA.

Ignatius's Beans, ST., are the seeds of *Strychnos Ignatii*, a tree growing in the Philippine Is., and were thus named by the Jesuits after the founder of their order. The seeds are horny, angular, and very bitter, and contain about 1.5 per cent. of strychnine as their active principle.

Igneous Rocks are one of the three great groups into which rocks are divided, the sedimentary and the metamorphic being the other two. As a class they have one distinctive feature, that they have all been in a state of igneous fusion at some period of their history. There are three classes of igneous rocks—the *effusive*, which have been poured out on the surface as sheets of lava emitted from volcanic craters or from fissures; the *intrusive*, which have been injected into veins, fissures, and pipes through the overlying rock masses, and have consolidated there without emerging to daylight; and the *plutonic*, which have solidified at great depths under enormous pressures, and have been exposed at the surface only after long-continued denudation. These distinctions are, however, more or less conventional.

The effusive igneous rocks are contemporaneous with the sedimentary strata among which they lie. They are practically always accompanied by ash-beds or tuffs (pyroclastic igneous rocks), the result of the steam explosions which precede or follow the outflow of lava; and in typical volcanic districts the sheets of crystalline lava, regularly jointed, alternating with these beds of stratified tuff, yield terraced effects on weathering, which are well seen in the west of Scotland and the north of Ireland. Most of the effusive rocks preserved in the earth's crust have originally been poured out beneath the sea over layers of mud and sand, and have been buried in sediment before renewed activity occasioned further discharges. If the geologist can prove that a series of igneous rocks is effusive, or interbedded, and that the sediments it accompanies contain fossils belonging to a certain epoch, the conclusion is certain that volcanic activity was rife at that period in that particular locality.

The intrusive rocks consolidate as sheets, sills, dykes, and veins. As crystallization has in this case gone on under pressure of the overlying masses, they present, in respect of their structure, an intermediate condition between the superficial lava flows and the deep-seated plutonic rocks. They are always of later date than the rocks they penetrate,

though they need not be much later, and may belong to the same geological epoch; and in themselves they tell us nothing regarding the exact time at which they were injected. The intrusive rocks which occupy the conduits of old volcanoes, through which the eruptive materials reached the surface, are known as necks. They are the remains of original craters. The intrusive masses which have been forced along the bedding planes of sedimentary rocks, and have consolidated there, are known as sheets or sills. When both thick and extensive, lifting up the rocks which overlie them to form a dome-shaped roof, they are often called *laccolites*. Very commonly they send dykes upwards into the fissures of the superincumbent strata. These intrusive igneous rocks are not interbedded with tuffs, except accidentally; they differ from superficial lava-flows in many of their structures. Intrusive masses filling vertical or nearly vertical fissures are known as dykes or veins.

Plutonic rocks occur in great areas or bosses, many of which are sheets or *laccolites* of vast size, which have cooled very slowly. Some of these bosses are many miles across; often they occur in groups. They may in some cases have been the central reservoirs from which volcanoes were supplied. Many, however, may have had no outlet to the surface. Around them there is often a perfect plexus of dykes and veins injected into the cracks which opened in the strata as the molten matter was forced upwards, or occasioned by the contraction of the greatly heated rocks as they cooled at a later period.

Igneous rocks consist principally of oxides, and these are, in order of importance, silica, alumina, iron oxide, lime, magnesia, and the alkalis potash and soda. Together these form over ninety-eight per cent. of most igneous rocks, the less abundant elements being titanium, phosphorus, sulphur, chlorine, vanadium, chromium, fluorine, and lithium. Of these constituents silica is the most abundant, amounting to nearly sixty per cent., and in many ways exercises a great influence over the structure and mineralogical development of rock masses. Igneous rocks fall into three great subdivisions, according to their chemical composition—the *acid* group, the *basic*, and an *intermediate* series. The mineralogical peculiarities of a few of the most basic rocks have led to the erection of a special or *ultra-basic* class for their reception. In general,

it may be said that the acid rocks contain most silica and alumina, least lime, iron, and magnesia, with a considerable percentage of alkalis. The basic contain least alkalis and silica, and most iron, lime, and magnesia. In the acid rocks there is enough silica to combine with the bases to form silicates, and an excess which, if it crystallizes, will yield free quartz. The basic rocks are dark in colour, and have a high specific gravity, in contrast to the pale-coloured and relatively lighter acid rocks. The ultrabasic rocks contain no felspar, the basic only soda-lime felspars, which are poor in silica. The intermediate rocks contain little or no quartz, and usually no olivine.

The important rock-forming minerals of the igneous rocks are very few, being quartz, orthoclase felspar, plagioclase felspar, nepheline, leucite, augite, hornblende, biotite, hypersthene, and olivine. Of these, quartz, orthoclase, biotite, and hornblende are commonest in acid rocks; olivine, augite, and plagioclase in the basic. In the intermediate rocks quartz and olivine are not common, but all the other minerals enumerated above may be abundant. It is usual, also, to distinguish between those minerals which are 'essential' and those which may or may not occur in any rock without altering its designation: these are called 'accessory.' The principal accessory constituents are apatite, zircon, magnetite, garnet, hematite, spinel, sodalite, haüyne, and nosean; while calcite, chlorite, epidote, hornblende, muscovite, and zeolites are common secondary products formed from the decomposition of the primary minerals when exposed to weathering.

The structure of igneous rocks (by which is meant the relation of the constituent minerals to one another, and the manner in which they unite to build up the whole mass) depends partly on its chemical and mineralogical composition, but principally on its individual history and the stages through which it has passed in the process of consolidation. Slow cooling is necessary for complete crystallization, and in consequence the plutonic rocks are 'holo-crystalline,' and consist entirely of crystalline materials. Had the same fused magma been very suddenly chilled, it would have formed a glassy mass, in which crystals were few, small, and imperfect, if they were not altogether absent. Most lavas and many dyke rocks have passed through a more complex history. Crystallization has begun with the separation of certain minerals in the fluid mass. These are

large and well formed; but when the rock was finally erupted, the remainder rapidly solidified in the form of minute interwoven crystals, which form a ground mass in which the larger crystals lie. There may be some undifferentiated glassy material in this ground mass, and the structure of such rocks is usually known as *hemi-crystalline*. These three types are usually easily recognized with the naked eye. Granite is holo-crystalline, obsidian is glassy or 'vitreous,' basalt or porphyry is *hemi-crystalline*.

The rocks belonging to one district and epoch—e.g. those of the great chain of volcanoes which girdles the Pacific, or of the district around Naples, the Hungarian basin, or the great Tertiary volcanoes of the British Isles, Faroes, and Iceland—form distinct 'petrographical provinces,' and the members of each group have so many points in common that they are said to be 'consanguineous.' It is very common to find that a great plutonic rock mass, which undoubtedly was produced by the consolidation of a single molten magma, is not homogeneous, but includes an enormous variety of rocks, ranging, it may be, from ultrabasic to acid. The dykes proceeding from such a mass may be equally varied, and many of them may be quite unlike any of the plutonic rocks. It is certain that during the cooling of such a fused magma there is a tendency for it to split up into parts which differ considerably in composition. This is known as 'magnetic differentiation.' As a rule, the most basic rocks are found near the outer margins of the boss, and were consequently the first to solidify; the more acid occur in the centre.

Ignis Fatuus. See WILL-O'-THE-WISP.

Ignorance of Law. Every one is presumed to know the law in the sense that ignorance of the law will not be accepted as an excuse so as to exempt a man from the consequences of his acts—e.g. from punishment for a criminal offence, or damages for breach of a contract. Of course, men often do not know the law, but the admission of ignorance as a ground of exemption would lead to interminable investigation of insoluble questions of fact, and would nullify the law by hindering the administration of justice. See also MISTAKE.

Ignorantines, a religious fraternity founded at Rheims in 1679, and organized in 1683 by Jean Baptiste de la Salle for the free instruction of poor children. The order is no longer confined

to France, but has spread over the world. The brethren, who take the usual vows of chastity, poverty, and obedience, but do not enter holy orders, are now better known as the Brothers of Christian Schools.

Igualeda, city, prov. Barcelona, Spain, on the Noya, 32 m. W.N.W. of Barcelona. It has leather and textile industries. Pop. (1900) 10,442.



Iguana.

Iguana, a genus of lizards remarkable for their large size and herbivorous habits. The common species, *I. tuberculata*, reaches a length of from five to six feet, and lives in trees in South and Central America and the W. Indies. The neck and back are furnished with a high crest, which is made up of separate spines. A similar row of spines occurs beneath the chin. The body and tail are long and compressed, and with the latter the iguana can give severe blows. The flesh is greatly esteemed as food, and to obtain it the iguanas are captured with nooses as they repose on the branches of trees. To the family Iguanidae belong a number of allied forms, such as the horned toad and the basilisk.

Iguanodon. In 1822 the geologist Dr. Mantell discovered in certain limestones of the Tilgate Forest (belonging to the Hastings beds of the Wealden) some remarkable teeth, the true nature of which was for a long time in doubt. They were of large size, and could only be compared to those of a genus of lizards, *Iguana*, which at the present day inhabits the tropics. Subsequently Dr. Mantell obtained several bones of the animal, which he called *iguanodon*, and among these were thigh bones over three feet in length, indicating a total length of nearly thirty feet for the animal. In 1878, in a fissure in the Carboniferous rocks of Belgium, the remains of twenty-three *iguanodons* were brought to light. The skeletons are from ten to fifteen feet in height, and the massive body terminated in a long and very strong tail. The fore limbs

were small, and adapted for grasping the leaves and branches of plants on which the animal fed. The animal probably walked in a nearly erect posture, the strong hind limbs bearing the weight of the body, though the smaller fore limbs may also have in some circumstances been made use of in progression. The tail probably, like that of the kangaroo, served as a support when the erect posture was adopted. On the hind feet were three toes, while the fore feet carried four and a curious bony spur, which may have been used for prehension or in defence. The head was relatively small, the teeth flattened, with a sharp, sawlike edge; and the lips are supposed to have been strong and flexible, as there are no teeth in the anterior part of the jaws. The *iguanodon* was a land reptile, belonging to the Dinosaurs. Several species are known, mostly from the Wealden and Purbeck beds. See Hutchinson's *Extinct Monsters* (1892); Smith Woodward's *Vertebrate Palaeontology* (1898); Owen's *Fossil Reptiles* (4 vols. 1849-84); Mantell's *Medals of Creation* (1844).



Skeleton of Iguanodon.

Iguvium. See GUBBIO.
Ijssel, riv. of the Netherlands, the northernmost arm of the Rhine delta, flows N. from near Arnhem, past Deventer and

Zwolle, and enters the Zuider Zee a little below Kampen. Length, 55 m.

Iki, isl. off the N.W. coast of Kiushiu, Japan. Gonoura, on the S.W., is a small seaport, affording a fair anchorage. Area, 57 sq. m. Pop. 36,530.

Ikon Basilike. See EIKON BASILIKE.

Ilagan, cap. of Isabela prov., Luzon, Philippines, 180 m. N.N.E. of Manila; a centre of the tobacco industry. Pop. (1898) 13,800.

Ilchester, tn., Somersetshire, England, 5 m. N.W. of Yeovil station. It dates from the British period. Traces of a Roman wall remain. Ilchester was a corporate town from 1289-1886. Roger Bacon was born in or near the town. Pop. (1901) 564.

Île-de-France. (1.) Ancient prov. of France, which in 1791 was divided to form the department of Seine, the greater part of the departments of Seine-et-Oise, Seine-et-Marne, Oise, and Aisne, and a small portion of Nièvre and Loiret. Its former capital was Paris. The most able of its dukes (who took the title of dukes of France) was Hugues le Blanc or Le Grand, who exer-

cised sovereign power under the Carolingian kings, Louis IV. and Lothair. His son, Hugh Capet, founded the Capetian dynasty. (2.) Former name for Mauritius.

Île du Diable, one of the group of Îles du Salut, off coast of French Guiana, 50 m. N.W. of Cayenne. Here Dreyfus was imprisoned (1894-9).

Ilerda. See LERIDA.
Îles du Salut. See FRENCH GUIANA.

Iletsks, or ILETSKAYA ZASHITA, tn., Russia, 45 m. s. of Orenburg; with salt deposits, which furnish annually over 200,000 tons. Pop. (1897) 11,802.

Ileum, the lowest part of the small intestine, of which it forms about three-fifths. The solitary glands and Peyer's patches (both consisting of lymph follicles) are more numerous in its mucous membrane than in that of any other part of the small intestine. It is the continuation downwards of the jejunum, and ends at the cæcum.

Ileus, or 'ILIAC PASSION,' an almost obsolete medical term for severe intestinal colic, or for intussusception.

Ilex, strictly the generic name of the hollies (see HOLLY), is also used to indicate the 'evergreen' or 'holm' oak, the *ilex* of Latin authors (*Quercus ilex*). This is a native of S. Europe, introduced into Britain in the 16th century; it is quite hardy, and withstands city smoke and sea-wind as few other evergreen trees do. It is easily raised from the acorn, but is somewhat difficult to transplant. Its leaves are sometimes prickly, and always downy below.

Ilford, par. and tn., Essex, England, on Roding R., 7 m. E. of London, is a popular residential suburb. Separated from Barking Town in 1890, it is now administered by an urban district council. It possesses a hospital chapel founded in Stephen's reign by Adeliza, abbess of Barking. There are paper mills and photographic dry-plate works. Pop. (1901) 41,240.

Ilfracombe, wat.-pl. and seapt. in Devonshire, England, on the Bristol Channel, 11 m. N.W. of Barnstaple. The town is sheltered on the N. by the Capstone Hill (180 ft.), and on the W. by the picturesque Tors (600 ft.). The town was formerly a flourishing port, and contributed six vessels to Edward III.'s fleet. Pop. (1901) 8,557.

Ilhavo, tn., Aveiro, Portugal, on a marine lagoon, 37 m. s. of Oporto; manufactures salt and glass, and carries on fishing. Pop. (1900) 12,545.

Ili, riv., Central Asia, rises in the Tian-Shan, E. of the Issik-kul, at an altitude of 11,500 ft., and passes close to Kulja, flowing W. to Iliisk, and then N.W. till it falls (by several mouths) into Lake Balkhash. The Ili is navigable for good-sized craft only between Iliisk and the Balkhash;

for rafts and small boats, to Kulja and a short distance beyond. Length of river, over 800 m.; its principal tributary is the Kash. It is not generally known by the name of Ili before the junction of the two head-streams, the Tekes and Kunges, at the head of the Kulja valley.

Iliad. See HOMER and EPIC.
Ilion, vil., Herkimer co., New York, U.S.A., on S. bk. of Mohawk R., and on Erie Canal, 11 m. S.E. of Utica; has manufactures of small-arms, typewriters, agricultural implements, and sewing-machines. Pop. (1900) 5,138.

Iliissus, small river in Attica, Greece, which rises in Mt. Hymettus, and flows past Athens on the S.E., falling into the Cephissus two or three miles to the S.W. of the city. It is dry in summer.

Ilithyia, in Greek mythology, the goddess who presided over childbirth; some accounts speak of more than one. She was the daughter of Hera, the goddess of marriage; and, though the divine midwife, was herself a virgin deity. Indeed, Artemis is apparently at times almost identified with Ilithyia, as being the protectress of the weak and tender.

Ilium. See TROY.
Ilk (A.S. *ilc*, *ylc*, 'the same'), 'of that ilk,' a phrase added to a person's surname to signify that the surname and the name of his ancestral estate are identical.

Ilkeston, munic. bor. of Derbyshire, England, 9 m. E.N.E. of Derby, near the Erewash R. and Canal. Hosiery, lace, and silk are manufactured, and there are iron works and collieries, also mineral springs. Cotmanhay forms the N. part of the borough. Pop. (1901) 25,383.

Ilkley, tn., W. Riding, Yorkshire, England, 14 m. N.N.W. of Bradford, and on the Wharfe, N. of Rumbles or Rumbalds Moor, on which rise the springs for which Ilkley is famous. There are several hydropathics, such as the Ben Rhydding, and a museum. Pop. (1901) 7,455.

Ili. See RHINE.

Ilawarra, dist. of New South Wales, Australia, commencing at Coal Cliff, 33 m. S. of Sydney, and consisting of a belt of land between the coast ranges and the ocean, extending southwards 40 m. to Shoalhaven. The scenery is beautiful and the land fertile. Pop. (1901) 7,884.

Ile-et-Vilaine, dep. (area, 2,699 sq. m.) of N.W. France, between the English Channel in the N. and the department Loire-Inférieure in the S. The Ile and the Vilaine flow from the N. and E. respectively to join at Rennes. The Couesnon takes its waters to the Bay of St. Michel in the N., while the Rance forms an

estuary between Dinan and the port of St. Malo on the English Channel. The department is a plateau with hills of low elevation. Formerly the W. portion was occupied by the immense forest of Brocéliande. The now fertile Dol in the N. was at one time part of the great forest, but was submerged by the sea and subsequently reclaimed. It produces cider, honey, and cheese. Oysters are exported. The chief town is Rennes. Pop. (1901) 613,567.

Illegal Practices. See ELECTIONS.

Illegitimacy. The proportion of illegitimate births in different countries varies from 3 to 15 per cent. of the total births. The figures cannot be taken as a simple index of morality, because local custom and tradition have a great influence. Thus, in Bavaria, marriage was formerly forbidden to all who were not members of a trade guild, or possessed of a considerable amount of property; and while this restriction was in force 22 per cent. of the births were illegitimate, but when the restrictions were repealed the proportion sank to 14 per cent. This is still an abnormally high percentage, and shows that the customs engendered during the period of restriction are still operative. In Scotland, again, the percentage is very high; but here, again, it is not possible to argue towards greater immorality, 'because in Scotland subsequent marriage of the parents legitimizes illegitimate children, and public opinion is inclined to take a comparatively lenient view of such cases. Attempts have been made to trace the variations in the percentage of legitimate and illegitimate births to race and to religion; and dishonesty in use of statistics is nowhere more common than in dealing with this phenomenon. Protestants ignore Sweden, and Prussia, and Scotland; Roman Catholics ignore Bavaria, and Austria, and Belgium, and make much of Ireland and the Rhine provinces of Prussia. Generally speaking, illegitimacy is common where the habit of early marriage does not prevail, and sometimes also it implies a comparative absence of prostitution. Illegitimate births are commonest in the class of female agricultural labourers and domestic servants, and large also in garrison towns. But districts with the same economic conditions, inhabited by the same race and of the same religion, vary so much that little more can be done than record the facts. The largest percentages are: Bavaria, 14 per cent.; Austria, 14; Saxony, 12; Sweden, 10.5; Denmark, 9; France, 8.8; Belgium, 7.7;

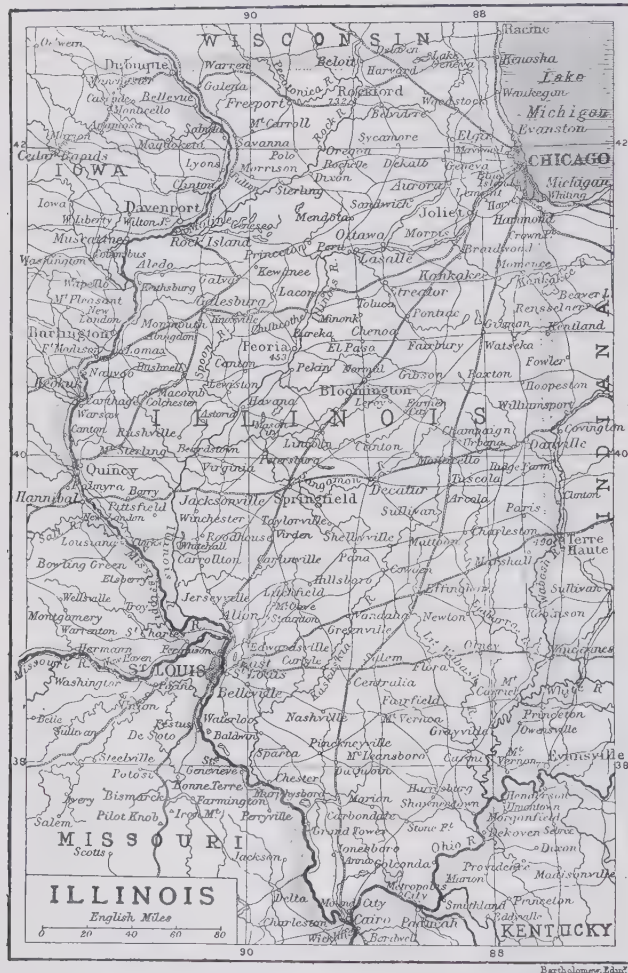
Prussia, 7; Scotland, 6.5; Italy, 6; England, 4; Holland, 2.5; Ireland, 2.7. The percentage is falling in England, Scotland, Holland, and Denmark, and is said to be increasing in other countries. In England the percentage varies: it is lowest in the south and increases towards the north, being as high as 8 per cent. in Shropshire, and 7 per cent. in

percentage is very low—about 27 per cent.—varying from 44 per cent. in Ulster to 0.7 in Connaught. For the United States and Canada there are no trustworthy figures; but in the Australasian colonies the percentages are very low. In Prussia there are the same variations between the provinces as are observable between Scottish and English

is level, almost without relief, and was originally prairie, but is now in a high state of cultivation. The Mississippi flows along its w. border, and the Ohio and its affluent the Wabash on the E. and S.E., while the middle is drained by the Illinois. The capital is Springfield, but the chief city is Chicago. In spite of the enormous development of Chicago, agriculture remains the leading industry of the state, and not less than seventy per cent. of its area is under cultivation. In respect of manufactures, Illinois is surpassed only by New York and Pennsylvania. The chief products are those of slaughtering and meat-packing, iron and steel, agricultural implements, foundry and machine-shop products, clothing, liquors, printing, and cars. The mineral resources consist mainly of coal, with zinc and lead, the last two mined in the N.W. part of the state. Pig iron is smelted in large quantities, mainly in and near Chicago. The population in 1900 was 4,821,550, the foreign-born amounting to 20 per cent. The number of negroes was 85,078, or 1.7 per cent. only. (2.) River, U.S.A., l. bk. branch of the Mississippi. It rises in the N.E. part of Illinois, near the head of Lake Michigan, separated from it by a very low divide, thence flows S.W., entering the Mississippi a few miles above the mouth of the Missouri. It has been connected from La Salle (250 m. up), the head of navigation, by canal with the Chicago R., and thus a flow has been established from Lake Michigan to the Mississippi. Length, 500 m. The drainage area is 29,000 sq. m.

Illinois, North American Indians, an extinct branch of the Algonquin family, whose name survives in the Illinois river and state, formerly inhabited by them. This name is a French corruption of *Iliniwok*, 'men,' but is of long standing, as La Salle (1670-82) speaks of the Lac des Illinois.

Illinois Central Railroad, U.S.A., received its charter in 1851. The first section, from Chicago to Dubuque, was opened in 1855, and the through line from Chicago to Cairo (364 m.) in the following year. The Dubuque line has been extended to Sioux City (509 m. from Chicago), and these two lines, with a third running from Cairo to New Orleans (547 m.), represent the main tracks of the company. The total mileage is 4,340, and it is proposed to absorb a number of other companies having a total mileage of 1,091. In 1902 the net earnings were £2,561,340, in 1903 £2,697,625, and in 1904 £2,419,100. The dividend from 1900-1 to 1903-4 was 6 per cent. per annum.



Westmorland and Cumberland and N. Wales. In Scotland the percentages vary from 18 per cent. in Wigtownshire and 16 in Banffshire to 4 per cent. in Kinross and in Shetland. On the whole, it may be said that the rate is higher, both in Scotland and in England, in agricultural than in manufacturing districts or in the cities. In Ireland the

counties. See Leffingwell's *Illegitimacy and the Influence of the Seasons on Conduct* (1892).

Illimani. See **ANDES**.

Illinois. (1.) One of the central states (abbreviated Ill.) of U.S.A., with an area of 56,650 sq. m. It was organized as a territory in 1809, and admitted as a state in 1818; it is sometimes known as the Prairie State. The surface

Illiterates, those who can neither read nor write. In recent years the comparative figures with regard to illiteracy in various countries have been obtained (1) by a census; (2) by the registration of illiterates among the recruits where universal conscription obtains; (3) by the enumeration of those who sign the marriage registers by means of a mark; and (4) in the United Kingdom by the number of voters who are unable to record their votes at a general election without making a declaration. The following are the results of the four methods of tabulation:—

1. Enumeration by Census.

Victoria (1901)	2'5	per cent.	
W. Australia (1901)	3'65	"	
Queensland (1901)	2'3	"	(unable to write).
S. Australia (1901)	2'28	"	"
Tasmania (1901)	20'29	"	"
Cape Colony (1891)	28'0	"	
Austria (1900)	20'4	"	
Belgium (1901)	22'1	"	
Hungary (1900)	47'4	"	
Italy (1901)	43'85	"	males and 60'39 females.
Portugal (1900)	78'6	"	
Roumania (1899)	88'4	"	
Servia (1895)	86'0	"	
Spain (1889)	68'1	"	
Württemberg (1900)	0'0	"	
U.S.A. (1900)	10'7	"	
Argentina (1900)	50'5	"	
Mexico (1898)	83'0	"	

2. Enumeration by Conscription.

Belgium (1902)	9'39	per cent.	
France (1900)	4'32	"	
Germany (1901)	0'05	"	
Greece (?1900)	30'0	"	
Holland (1902)	2'1	"	
Italy (1901)	32'61	"	
Russia (1900)	76'0	"	
Sweden (1900)	0'08	"	
Switzerland (1902)	0'15	"	(could not read).
"	0'51	"	(could not write).

3. Enumeration by Marriages.

	Men.	Women.
England and Wales (1901)	2'5	2'9
Scotland (1901)	2'16	2'76
Ireland (1902)	11'5	9'4
New South Wales (1896)	2'34	2'04
Queensland (1902)	2'0	(men and women together).
France (1900)	4'4	6'3
Italy (1901)	32'74	46'10
Prussia (1899)	0'70	1'19

4. Enumeration by Votes (1895).

	Voters.	Illiterates.	Per cent.
England and Wales	3,190,826	28,521	0'893
Scotland	447,591	4,062	0'907
Ireland	220,506	40,357	18'0
Totals	3,858,923	72,940	1'89

Note.—Many so-called illiterates in Wales and Scotland speak or read Welsh or Gaelic, but not English.

In the United States (census 1900) a record was made of the illiterate population over ten years of age, with the following result:—

in 1776, by Adam Weishaupt (1748-1830), to combat the obscurantism of the Jesuits, who were then supreme in that state. It developed a kind of humani-

Illumination of Manuscripts

tarian deism as a programme. The Jesuits were powerful enough to secure its suppression in Bavaria in 1784-5.

Illumination, Enlightenment (*Aufklärung*), terms applied to the rationalism of the 18th century, so far as it was an attempt to substitute universally and thoroughly the free conclusions of reason for all mere traditional authority and convention in religion and in the state. With some—e.g. Voltaire—criticism of the glaring defects of established institutions was the primary interest. But the thinkers known as the Encyclopédistes moved in the direction of a constructive philosophy of human nature and the world, which they could oppose to the traditional system. The constructive efforts of 18th-century freethought, however—whether, as in the case of the Encyclopédistes, they tended towards a bold materialism, or, as in the case of other less extreme contemporary French and German rationalists, towards a colourless deism in religion and a commonplace utilitarianism in morals—were generally marked by a very narrow and not very lofty conception of human reason. And the criticism of later thought has unanimously been, that the 18th-century rationalism purchased clearness at the expense of depth, so that the enlightenment has become almost a byword for all that is superficial and inadequate in philosophic thinking.

Illumination of Manuscripts, an art of great antiquity, is exemplified in Egyptian papyri. Roman authors speak of classical works similarly adorned, but none earlier than the Vienna *Dioscorides* and the Vatican *Virgil* of the 4th century remain. To the same century belongs the *Codex Argenteus*, now at Upsala, containing part of Ulfilas's Gothic Bible, and written in gold and silver on purple vellum. The chief styles of illumination are:—(1.) *The Byzantine*, which took its rise after the 2nd century at Constantinople, blending Oriental with Western ornament; is characterized by magnificent execution and the lavish use of gold backgrounds. (2.) *The Irish*. In Ireland a distinctive and beautiful style of illumination was early elaborated in the monasteries. The ornamentation consists mainly of spirals, plaits, and interlacings of grotesque monsters. The best examples are the *Book of Kells*, at Dublin, and the *Lindisfarne Gospels*. These methods were carried far and wide by the Irish continental missionaries, and exerted a powerful influence on the succeeding (3) *Carlovingian Style*. This arose in France and Germany under the encourage-

ment of Charlemagne and Alcuin. The Gospels found on the emperor's knees when his tomb at Aachen was opened, and the Harleian *Codex Aureus* in the British Museum, are capital examples, marked by splendour of colouring and harmonious design. Here arise the gigantic initials containing miniature pictures. (4.) Meantime a new style arose in England, the *Opus Anglicum*, showing much freedom and spirit, and characterized by a peculiar 'fluttering outline.' The finest example is a *Benedictional of St. Ethelwold*, now at Chatsworth. (5.) After 1000 the art was helped by Greek artists who migrated from Constantinople. Gold leaf was laid on an impasto of fine plaster and brilliantly burnished. Skill in drawing increased rapidly, and towards the 14th century foliage and other natural objects are the principal *motifs*. Initials decrease in size, gaining in perfection. Among many masterpieces is the *Bedford Missal*, in the British Museum, written (1423) for the Duke of Bedford, son of Henry IV. of England. (6.) Italian work is different, being more affected by classical influences and marked by extreme delicacy. The *Choir Books* of the cathedral of Siena afford a notable example. (7.) With the renaissance comes decline, though the *Book of Hours* of Anne of Brittany, executed by Jean Bourdichon (end of 15th century), is a priceless treasure. The great majority of European illuminated mss. were produced in the scriptoria of the monasteries, though lay artists also were employed, especially in later times. The invention of printing put an end to this beautiful art. See Silvestre and Champollion's *Universal Palaeography* (Eng. trans. 1850); Bradley's *Manual of Illumination* (1860); Shaw's *Art of Illumination* (2nd ed. 1870); Middleton's *Illuminated Manuscripts* (1892); Falconer Madan's *Books in Manuscript* (1893).

Illuminations. See PYRO-TECHNICS.

Illusion. An illusion, as distinguished from a hallucination, is an erroneous mental construction based on some real object perceived or remembered. In hallucination there may be some sensory disturbance which initiates the hallucination; but the sense-stimulus implied has no similarity to the image evoked. In illusion, on the contrary, an object is present, and gives rise in part to its usual sensations, which, however, are wrongly interpreted. Both conditions presuppose some degree of dissociation of consciousness. Sully uses the term 'illusions' to include dreams—hallucinations, illusions of belief and memory, as well

as forms of sense-deception, normal and morbid. Illusions of perception have an unlimited range. Of normal illusions, those arising out of visual misinterpretations are the most familiar. The wheel-of-life and the cinematograph are good instances. The illusions of the conjurer and juggler—for instance, vanishing of balls and sword-swallowing—are likewise good examples. Illusions of memory are of infinite variety, and are more common than sense-illusions. In the retrospective estimate of time, illusion is extremely common. In some forms of insanity, the readiness to misinterpret sense-perceptions is extreme, almost every object being taken for something else. The subjective factor predominates. Usually illusion has some admixture of hallucination, especially in the insane. See HALLUCINATION; also Parish's *Hallucinations and Illusions* (1897)—critical examination of theories; Stout's *Manual of Psychology* (2nd ed. 1901), vol. ii. p. 413—general psychology of illusions; Sully's *Illusions* (4th ed. 1895)—critical and descriptive account from standpoint of normal psychology; optical illusions (stereoscope, etc.). Le Conte on *Sight* (1872).

Illustrated London News. THE, first serious attempt at illustrated journalism in England. It was started as a fivepenny weekly (the price was subsequently raised to sixpence) in 1842 by Herbert Ingram, a news-agent at Nottingham. Though the first number had only a dozen small pictures, its success was undoubted, and it rapidly developed. In 1848 Charles Mackay became editor, while Mark Lemon was a regular contributor. On the artistic staff were John Gilbert, Birket Foster, and John Leech, while Staunton, the chess champion, wrote on his own subject. At that time, and for many years later, the *News* was without any rival in its own class. It sent no less than three special artists out during the Crimean war, and in later campaigns one of its distinguished representatives has been Mr. Melton Prior. Herbert Ingram, the founder of the *News*, died in 1860, and was succeeded by Sir William Ingram, who, about 1900, was in turn succeeded by Mr. Bruce Ingram, the present editor. Previously the editorial chair was filled for many years by John Latey. Among the regular contributors to the *News* in later years were George Augustus Sala (whose 'Echoes of the Week' were long a popular feature), Mr. James Payn, Mr. Clement Scott, Mr. L. F. Austin, Dr. Andrew Lang, Dr. Andrew Wilson, and many others.

Illustration of Books. The earliest available examples of book illustration in Europe are the illuminated manuscripts, which have been already treated of under that heading. The art of printed illustration may be said to date from 1423, when popular figures were cut in wood, as we know from the 'St. Christopher' of that date, in the possession of Earl Spencer. The single leaf, with a figure printed upon it, preceded the 'xylographic' book, in which text and illustration were cut in the same block, this latter process appearing about the second quarter of the 15th century. Among the earliest of these illustrated books were the Latin *Syntax* of Elius Donatus and the famous *Speculum Humane Salvationis*, a collection of precepts addressed to the faithful. Then appeared the *Biblia Pauperum*, one of the most celebrated and most frequently reproduced of the block books, the *Ars Moriendi*, and the *Ars Memorandi*. William Caxton, the first printer in England, has also the credit of introducing wood engraving into this country. The first illustrated book printed in England was the second edition of Burgh's *Parvus et Magnus Catho*, which appeared about the year 1481. Caxton's *Game and Playe of the Chesse* is similarly illustrated.

Next came the art of 'cross-hatching' in the illustration of books, the earliest specimens being the frontispiece to the Latin edition of *Breydenbach's Travels* in 1486, and the famous *Nuremberg Chronicle*, printed seven years later. The engraver of the former work is believed to have been Michael Wöhlgemuth, the teacher of Albrecht Dürer, and one of the 'mathematical men' who superintended the illustrations in the *Nuremberg Chronicle*. Then came the period of Dürer, whose principal works were the famous series of engravings illustrating the *Apocalypse*, the *Life of the Virgin*, and the *Great Passion*. He was followed by Lucas Cranach, Hans Burgkmair, Hans Schäufelein, and Hans Holbein, the last-named celebrated for his *Dance of Death* and his *Bible Cuts*, produced in Lyons in 1538. The art of engraving then declined in Germany, France, and Italy; but it again revived—this time in England—with Thomas Bewick, whose most important works were *The History of Quadrupeds* (1790) and *The History of British Birds* (1797-1804; 8th ed. 1847). Bewick was not only his own engraver, but also his own artist; and in the art of wood-engraving his work has never been excelled since 1775.

The invention of the art of



Examples of Illumination of Manuscripts.

1. Border from *Book of Hours* of Henry VII. 2. Visigothic initial, from *Lives and Passions of the Saints* (Spanish), 919 A.D. 3. From *Vegetius's Art of War* (North of France), 13th century. 4. From the *Codex Aureus*. 5. Heading to St. John, from the Lindisfarne Gospels, 700-720 A.D. 6. From Aristotle's *Ethics* (Italian), 16th century. 7 and 11. From Bible of St. Denis (Caroline Saxon), 9th century. 8. Initial from *Book of Hours* of St. Louis, 1250 A.D. 9. From *Ordnances relating to the Office of Admiral* (English), early 15th century. 10. From *Hours of the Virgin* (French), early 15th century.

lithography in 1796 gave a great impetus to the production of illustrated books, notable for their cheapness as compared with the prices in the preceding eras of wood and metal engraving. Among the greater artists in this department were Prout, Bonington, Ward, Cattermole, and Lewis. Simultaneously there was the cultivation of the expensive art of steel engraving, of which the best specimens were the *Annals* and the *Italy* of Samuel Rogers, the banker, illustrated by Turner and Stothard at an outlay of £10,000. To these artists succeeded the school of Cruikshank, Leech, 'Phiz' (Hablot K. Browne), and the early artists who illustrated Dickens and *Punch*. Next came a notable revival of the art of wood-engraving in illustrating books in the work of John Tenniel, Sir John Gilbert, Birket Foster, Harrison Weir, T. Creswick, W. Mulready, and others, who paved the way for the famous pictorial art of the 'sixties, introduced by the *Poems* of Tennyson in 1857, containing some of the finest work of D. G. Rossetti and Holman Hunt, and illustrations supplied by Walker, Houghton, Pinwell, North, Lawless, Sandys, Keene, Morton, Watson, and others, who also contributed extensively to *Once a Week*, *Good Words*, *The Cornhill Magazine*, and other magazines, plates of uniform beauty, most of them engraved by the brothers Dalziel. These are now eagerly acquired by collectors, especially in Germany, where they are appreciated as approaching closely in execution to that nation's series of wood-engravings by Menzel to illustrate Kugler's *Frederick the Great*. This revival was continued in the *Graphic*, which started in 1869, where we find some of the finest work of Houghton, Pinwell, Herkimer, Gregory, Woods, Green, Small, Fildes, Holt, and others.

The art of book illustration has in recent years been worthily sustained by Caldecott, Crane, Kate Greenaway, Barnard, Sullivan, Caton Woodville, Furniss, Raven Hill, Hugh Thomson, Partridge, Phil May, A. B. Frost, E. A. Abbey, C. Dana Gibson, Parsons, Millet, Reinhardt, and many others.

Photogravure is now in extensive use, the work of the firm of Goupil enjoying a special reputation for its excellent technique.

Since 1875 what is called 'process' has held the field against every other form of book illustration, the term being applied to the reproduction of a drawing or photograph by purely mechanical means in the manufacture of the block. For this subject see PROCESS WORK.

See Linton's *Masters of Wood Engraving* (1889); Chatto's *Treatise on Wood Engraving* (2nd ed. 1861); Pennell's *Modern Illustration* (1895); Crane's *Decorative Illustration of Books* (1896); Gleeson White's *English Illustration*, 'The 'Sixties, 1855-70' (1897), and *The Brothers Dalziel* (1901).

Illyria, or ILLYRICUM, anciently the mountainous part of the Balkan Peninsula which lay along-side the Adriatic N. of Epirus (Albania), being roughly coincident with the modern Bosnia, Herzegovina, Dalmatia, and S.W. Hungary. The inhabitants were a mixed race, usually considered to have been akin to the ancient Thracians. A rude and pastoral people, they were also addicted to piracy at sea; and although ruled by a number of petty chiefs, they managed to extend their power over Macedonia early in the 4th century B.C., until the energy and military talents of Philip II., Alexander the Great, and Philip III. completely overcame them. Pyrrhus, king of Epirus, seized a part of their territory, and in 228 B.C. their queen Teuta was compelled to yield a strip of the coast lands to Rome, as well as to pay a tribute. During the next two centuries the Illyrians made repeated attempts to shake off the Roman yoke, especially under Genthius in 168 B.C., but unsuccessfully, and in 35 B.C. Illyria was definitely made a Roman province. Although at first included in the Western empire, Illyria passed in 476 to the Byzantine empire. The country was invaded and settled by Slav tribes in the middle of the 6th century, but was for the most part subject to the rule of Hungary, Venice, and Byzantium, until it was finally captured by the Turks in the 14th century. The Roman emperors Valens, Claudius, Aurelian, Probus, Diocletian, and Maximian were all of Illyrian birth. In the 17th and 18th centuries the name Illyrians was used to indicate the Slavs who belonged to the Orthodox Greek Church. Napoleon created the Illyrian provinces in 1809, and in 1816 Austria formed the kingdom of Illyria, which embraced Carniola, Carinthia, Istria, and other territories. Again, towards the middle of the 19th century attempts were made to fuse the nationalities of the Southern Slavs—i.e. Servians, Croats, and Slovenes together into one common people under the name of the Illyrian peoples. The scene of Shakespeare's *Twelfth Night* is laid in Illyria.

Ilmen, or 'MOJSK,' LAKE, freshwater basin of N.W. Russia, close to Novgorod city. It is 25 m. long from E. to W. (at the most), and 19 m. from N. to S. covering an

area of over 360 sq. m. It lies only 93 ft. above the Baltic level; its greatest depth is only 30 ft., its average depth 6½ ft. Its banks are flat and featureless.

Ilmenau, tn. and summer resort, grand-duchy of Saxe-Weimar, Germany, at N. foot of the Thüringer Wald, 30 m. by rail S. of Erfurt. It manufactures porcelain, glass, toys, and various steel wares. Here are a hydropathic and other bathing establishments. Pop. (1900) 10,416.

Ilmenite, or TITANIFEROUS IRON OXIDE, FeO, TiO₂, is a common rock-forming mineral which is chiefly found in small crystals in basic igneous rocks and schists, though locally it occurs in great masses which are made use of as iron ores (Arendal and Tvedestrand, Norway.) As a rule it is free from sulphur and phosphorus, but is very refractory, and is in consequence much used for lining puddling furnaces. It is black and hard (h.=5-6, sp. gr. 4½ to 5). From magnetite it may be distinguished by its not being attracted by a weak magnet. Its crystals belong to the hexagonal system. Often this mineral is decomposed into a fine powdery substance, which is known as leucocene, and appears to be merely a granular variety of titanite or sphene.

Ilminster, par. and mrkt. tn., Somerset, England, 10 m. S.E. of Taunton, with fine Perpendicular church; grammar school dates from 1549. Pop. (1901) 2,287.

Ilo, tn., British colony of Nigeria, W. coast of Africa, on the Niger, in about 11½° N. lat.

Il Obeid. See EL OBEID.

Ilocos Norte, prov. in N.W. Luzon, Philippines. It is 1,873 sq. m. in area, and is mountainous, but contains fertile valleys. Cap. Laoag. Pop. (1900) 156,700.

Ilocos Sur, prov. in N.W. Luzon, Philippines, 644 sq. m. in area; yields vegetables and medicinal plants in abundance. Cap. Vigan. Pop. (1900) 172,836.

Iloilo. (1.) Province in S.W. of Panay, Philippines, opposite the island of Negros. It is fertile and well-watered. The chief products are tobacco, sugar-cane, rice, and maize. Gold is found. Area, 2,600 sq. m. Pop. (1900) 472,798. (2.) Town, cap. of above prov., on E. coast, opposite the island of Guimaras. It is the second city of the Philippines, and ranks next to Manila as a port. The exports are sugar, tobacco, hemp, and perfume. Pop. (1898) 10,400.

Ilorin, chief tn. of a native sultanate in the British colony of Northern Nigeria, W. coast of Africa. It has an extensive caravan trade, and produces wood-carving, pottery, and leather. Pop. (1901) about 50,000.



Illustration of Books.

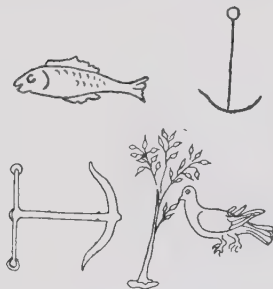
1. Illustration by Millais for *The Talking Oak* (Tennyson's Poems, 1857). 2. Illustration by Rossetti for *The Palace of Art* (Tennyson's Poems, 1857). 3. St. Christopher, 1423. 4. Illustration by Fred Walker for Thackeray's *Philly* (from the *Cornhill Magazine*, by permission of Messrs. Smith Elder & Co.). 5. Illustration by 'Phiz' (Hablot K. Browne) for Dickens's *Dombey and Son*.

Isley East (anc. *Hildesley*), mkt. tn. and par., Berkshire, England, 11 m. s. of Abingdon. Noted for its sheep markets and fairs. Race-horses are trained on the neighbouring downs.

Ilus, a Trojan hero, son of Tros and Callirhoe, and grandfather of Priam; was held to be the founder of Ilion or Troy.

Image, SELWYN (1849), English artist, born at Bodiam, Sussex. He studied art under Ruskin, and is known as a decorative artist and craftsman, especially in stained glass. His best windows are in Morthoe church, Devonshire, and the west window of St. Luke's, Camberwell. He is author of *Carols and Poems* (1894).

Image-worship. Images were not introduced into the churches of the primitive Christians, nor pictures, except in the form of symbols, such as the dove, the palm branch, the anchor, the fish, etc. So long as the church was engaged in mortal struggle



Early Christian Symbols.

with heathenism there was a strong feeling against images, as savouring of idolatry. Tertullian (*De Idololatria*) condemns even the art of the painter as unlawful. The Council of Eliberis (Elvira in Spain) in 306 resolved that pictures should not be used in churches. The early catacombs show only symbolic designs. It was not until the end of the 4th century that pictures of saints and martyrs were set up in churches. The sixth General (Trullan) Council, held at Constantinople in 692, enjoins that Christ shall no longer be depicted merely under symbol of the Lamb, but shall be represented as a Man. The second Council of Nice, in 787, sanctions images of God the Father, the Holy Trinity, etc., in all the churches. At the same time distinction was carefully drawn between *latreia*, or adoration, and *douleia*, or reverence. It was also taught that even *douleia* must not be paid to the pictures or images, but only

to the persons so represented. The habit of using images as helps to devotion grew rapidly; candles and incense, etc., were freely offered to them. Images were even used as god-parents in baptism. The superstitious would mix dust scraped from them with the eucharistic elements. This worship of images was the subject of heated controversy in the early church. In the 8th century a party of iconoclasts arose in the Eastern Church. The Emperor Leo III. (the Isaurian) issued an edict in 726 forbidding honours to images. Another decree in 730 prohibited all image-worship, under pain of death, as idolatrous. In spite of the opposition of Popes Gregory II. and III., Leo and his successor, Constantine Copronymus, held their ground. This policy was continued more or less until the 9th century, when the worship of images was restored (842) by the Emperor Theophilus. The modern use of the Greek Church permits ikons, or pictures, but disallows graven images. The Roman Catholic Church strongly supports the use of images (Council of Trent, sess. xxv.). Charlemagne opposed the decrees of the second Council of Nice (787) in favour of images, and was supported by Alcuin. The English Church of that date seems to have generally repudiated image-worship, as also did the council at Frankfort, at which were present British, Gallican, German, and Italian bishops. They were afterwards freely introduced into Britain, as the records of the reforming iconoclasts of the 17th century prove. The Lutheran Church still permits their moderate use.

Imago, the name given to the adult sexual insect. Thus the butterfly is the imago of the insect whose larval stage is the caterpillar. Except in the primitive wingless insects, and in certain parasitic and degenerate forms, the imago of an insect may be recognized by the presence of wings, which are always absent in the larval stages. See INSECTS.

Imaizumi. See GIFU.

Imam, or IMAUM, the priest who, in the Mohammedan worship, leads the prayers of the faithful and recites the prayers.

Imandra, or INANDRA (LAKE), the chief fresh-water basin of Russian Lapland, Archangel gov., in 67° 30'–68° N. lat.; sometimes called the Lesser Imandra, to distinguish it from Enare, or Greater Imandra, in N. Finland. It is about 65 m. in length from N. to S., by 6 m. from E. to W. Its area has been estimated at 320 sq. m.; its greatest ascertained depth is 66 ft. It drains

into the north-western end of the White Sea. Its fisheries are profitable in summer.

Imantophyllum, a genus of bulbous plants belonging to the order Amaryllidaceae. They are conservatory or cool greenhouse plants, thriving in a light, fibrous loam containing a fair proportion of leaf-mould. Propagation is usually effected by means of offsets.

Imatra Falls, Finnish waterfalls, in prov. Viborg, and in river Voksa or Wuoxen, issuing from Lake Saima on its way to Lake Ladoga. Here, in a gorge over 120 ft. across, the river falls over more than 68 ft. in about 1,060 ft.

Imbecility. See IDIOCY.

Imbros, isl. in N.E. of the Aegean Sea, a little S. of Samothrace, and W. of the Thracian Chersonese. It belongs to Turkey, and is the seat of a Greek bishop. Its area is about 100 sq. m. Though mountainous, it is well wooded and fertile. Goats are reared in large numbers. The chief town is Kastron (Castro). Pop. 9,000, mostly Greeks.

I.M.D., Indian Medical Department.

Imeritia, a former division of Georgia, now forming part of the Russian gov. of Kutais, Transcaucasia. See GEORGIA and KUTAIS.

Imitation, as a term in music, is applied to a kind of contrapuntal device much used in certain forms of musical composition. It frequently consists of two or more parts, replicas of each other, at the same or some other pitch, or differing but slightly in interval and time value of notes. The composition begins with a single part; the others start one by one after short intervals of time while the preceding part or parts are progressing; and the subject must be so arranged that, notwithstanding the different relations as to pitch and time, the united sounds produce correct harmony. Among other methods of imitation are those caused by inversion, reversion, augmentation, and diminution. See CANON; COUNTERPOINT; FUGUE.

Immaculate Conception, a Roman Catholic festival observed on December 8 in honour of the supposed conception of the Blessed Virgin Mary without taint of original sin. A festival of the Conception of St. Anne, the mother of the Virgin, is held by the Greek Church on December 9. The idea on which this dogma is founded is traceable in the Greek Church to the 5th century; in the Latin it developed slowly. It naturally followed the acknowledgment of the Vir-

gin Mary as *Mater Dei*. Even in the 12th century it was by no means generally accepted. In 1131 Bernard of Clairvaux rebuked the canons of Lyons for introducing the festival into their cathedral. The immaculate conception was a subject of prolonged controversy between the Scotists and Thomists in the 14th century. Duns Scotus and his followers (Franciscans) maintained the doctrine, while the Thomists (Dominicans) and their leader, Thomas Aquinas, opposed it. The University of Paris at first sided with the Thomists, but reversed its judgment in 1387. Among other forces which worked towards the same end were the Council of Basel (1439), the pronouncements of Pope Sixtus IV., the decrees of Trent excepting the Virgin Mary from the universal curse of original sin, and the strong support of the Society of Jesus. Controversy continued to rage fiercely until Pope Gregory XV., in 1622, forbade any public discussion on the subject. Yet in spite of the general acceptance of the doctrine, it was not exalted into an article of faith until Dec. 8, 1854, when Pope Pius IX. published the bull 'Ineffabilis Deus,' declaring 'that the Blessed Virgin Mary at the first instant of her conception, by a singular privilege and grace of the omnipotent God, in virtue of the merits of Jesus Christ, the Saviour of mankind, was preserved immaculate from all stain of original sin.'

Immanence, Immanent. The philosophical term 'immanent' has two chief meanings or applications. (1.) As contrasted with 'transcendent': for example, whether God's nature is completely expressed in His activity within the world of nature and history, in maintaining it and ordering its course, or whether He has a life of His own, so to speak, apart from the world. The former doctrine (God's immanence) may easily pass into a pantheistic absorption of God in the world, whereas the doctrine of God's transcendence may easily be exaggerated into a deistic separation of God from the world which He has created. (See **PANTHEISM** AND **DEISM**.) Some theologians consider divine immanence and transcendence to be, when properly defined, not incompatible (see, for example, Fairbairn's *Christian Modern Theology*, 1893, pp. 414-17). (2.) 'Immanent' is contrasted with 'transcendent.' Activity or causality, the effects of which remain within the agent, is said to be immanent; whereas that which, going beyond the agent, produces effects in other things, is said to be transcendent. For the classical discussion of the questions involved in this dis-

inction, see Lotze's *Metaphysic* (trans. ed. by B. Bosanquet, 1884), bk. i., ch. iv.-vi.

Immanuel, or **EMMANUEL** (Heb. *immanu-El*, 'God is with us'), the name of the child whose birth and experiences were to be a divine sign to Ahaz, king of Judah, during the war with Syria and Ephraim (Isa. vii.). Considerable diversity of opinion prevails with regard to the exact significance of the prophecy, but in Matt. 1:22 f. it is spoken of as referring to the Messiah, whence the common application of the name Immanuel to Jesus Christ.

Immemorial Time. See **TIME** **IMMEMORIAL**.

Immermann, **KARL LEBERRECHT** (1796-1840), German novelist and dramatist, was born at Magdeburg. After fighting at Ligny and Waterloo under Blücher, he entered the Prussian state service, and became acquainted with his lifelong friend, the Countess von Ahlefeldt. Besides the humorous idyllic romances of *Die Epigonen* (1836) and *Münchhausen* (1839—a double work, one half bearing the separate title of *Der Oberhof*), he wrote numerous plays. His works, with *Life*, were published in 20 vols. by Boxberger (1883). See *Life* by his widow and G. zu Putlitz (1870).

Immigration is much more of a social and political problem than emigration is. The chief cause of immigration is economic, and the immigrant comes, as has been said, because of suction from within rather than of pressure from without. In the three first quarters of the 19th century the United States required and attracted settlers; but now the characteristic need of the country is not settlers, but a class of men who will work in gangs, as in railroad-building, which the native American and the original class of settlers are unwilling to do. But the class which is economically needed is not socially so desirable as the earlier immigrants. There can be no doubt, for example, that the Chinese labourer has been of great economic service, but there is equally little doubt that he is not a desirable citizen. He does not intend, as a rule, to remain in the country, and he does not spend his wages in the country. Even in the United States, where the character of the nation may be considered formed, the assimilation of hundreds of thousands of uneducated, untrained foreigners is a task of great magnitude. The immigrants to that country are now drawn mainly from the Slav and Latin nations. These immigrants do not to any great extent prove harmful competitors in the labour market, for they come to do work which the

native workmen are not willing to do. Similarly, restrictions have been placed upon the immigration of indigent Europeans as well as of the yellow races by Australia, Canada, Transvaal, Argentina, and other countries. In 1905 an act to prohibit undesirable alien immigration was passed in the British Parliament. See **EMIGRATION**, **ALIEN IMMIGRATION**, and the references there given. See also Whelpley's *The Problem of the Immigrant* (1905).

Immoral Agreements are void, as being contrary to public policy. The only kind of immorality which in fact the law takes notice of is sexual immorality. An agreement based upon the promise or expectation of future immoral relations is void. An agreement in consideration of past immoral relations is good, although in England it is not enforceable unless under seal, as there is no consideration.

Immortalité, a British first-class cruiser (5,600 tons) launched 1887. The name was introduced with the French *Immortalité*, captured off Brest on Oct. 20, 1798.

Immortality, the continued existence of the human personality after the event of physical death. The vast majority of civilized peoples have made it a fundamental constituent of their philosophy of human nature. The Egyptians believed that the spirits of the dead descended to the under world, where they were judged by Osiris and his assessors; but the embalming of the body seems to indicate that they expected the soul at some future time to be reunited to its crewhile physical companion. Similarly the Babylonians and Assyrians, who conceived of the intermediate abode of the dead as a city named Sualu (cf. Heb. *Sheol*), believed that the true immortality began only with the resurrection of the body. The Persians (Zoroastrians) and the Hebrews probably held analogous views. It is indeed sometimes denied that the Hebrews possessed a doctrine of immortality, and certainly they did not regard the post-mortem existence in *Sheol* as life in any true sense; nevertheless there was among them a prophetic expectation of a deliverance from *Sheol* (Ps. 16:10, R.V.; 49:15)—i.e. something of the nature of a resurrection. To the Greeks, on the other hand, the idea of the body rising again was entirely alien (cf. Acts 17:32); Socrates believed that death and philosophy had this benefit in common—viz. that they freed man from the power of the material (*Phædo*). The Christian view, as presented in the New Testament, has more in common with the Hebrew than with the

classical belief: thus Paul's conception of immortality always includes the resurrection of the body—a spiritual body, indeed, transformed and glorified (1 Cor. 15:44, 52). This is the orthodox doctrine (*Conf. of Faith*, xxxii. 2), yet the Greek idea of the immortality of the soul has always held a firm place in the Christian consciousness. Modern attempts to prove the immortality of the soul (e.g. Wolff's) carry no conviction, and even Kant's acceptance of it as a postulate of the reason barely carries assent. So soon as we leave the ground of Scripture (or rather that of the value-judgment, the *Werturtheil*—i.e. the estimate of the worth of human life, as in Browning) there is no barrier between our questioning and the chill shades of agnosticism. The immortality of influence (celebrated in George Eliot's noble lines, 'Oh, may I join the choir invisible,' etc.) can hardly be said to satisfy the craving of the heart. See Salmond's *The Christian Doctrine of Immortality* (4th ed. 1901); works on O.T. and N.T. theology by Schultz and G. B. Stevens; F. H. Bradley's *Appearance and Reality* (2nd ed. 1902). See also TRANSMIGRATION.

Immortelles. See EVERLASTINGS.

Immunity, in medicine, implies a state of complete or partial insusceptibility to the influence of certain drugs and certain morbid agents. Natural immunity is to some extent proportionate to the state of the general health. Every organism possesses within itself the means of protection against its parasitic enemies, and the more healthy the organism is, the stronger are its powers of self-defence. Age is a factor, for adults seldom suffer from measles, scarlet fever, or whooping-cough, while enteric is rare except in the middle period of life. A certain degree of acquired immunity against subsequent infection is conferred upon a patient by one attack. A familiar example of acquired immunity is that conferred by vaccination against smallpox. Metchnikoff holds that the phagocytic properties of the white blood corpuscles (see INFLAMMATION) have an important bearing on the production of immunity. According to this view, the injection of attenuated virus 'educates' the white blood cells to destroy even stronger virus of a similar nature. Normal blood serum, however, has a solvent action on bacteria; and in immunized animals, according to Jürgelinas, the serum has greater destructive powers. On the other hand, Roux and Yersin have shown that some diseases are due to toxins manufactured and thrown out by bacteria, rather than

to the bacteria themselves; and Behring demonstrated that the tissues of patients immunized by successive attenuated doses of these toxins acquire the power of producing anti-toxins which neutralize the poison. The frequent use of certain drugs confers a similar insusceptibility to their influence and effects: thus, arsenic and opium eaters are able to take their favourite drugs in doses which would prove fatal to those who have not acquired immunity. By a series of gradually increasing doses, Calmette and Sir Thomas Fraser have even accustomed animals to withstand the injection of lethal doses of snake venom. See Metchnikoff's *Immunity in Infectious Diseases*, trans. by Binnie (1905).

Imola, tn. and episc. see, Italy, prov. Bologna, 22 m. by rail S.E. of Bologna; glass, silk, and other industries. It was the Roman Forum Cornelii. Pop. (1901) 33,144.

Impact, in its simplest aspects, refers to the laws of collision of bodies. The impact may be comparatively slight, the bodies experiencing no permanent change of form, but simply a more or less abrupt alteration in their motions. On the other hand, the impact may be so great as to cause shattering, or at least permanent deformation, of the impinging bodies. The dynamical discussion of these extreme cases is quite beyond our most powerful mathematics. It is evident, however, that the original kinetic energy of the impinging bodies will be largely transformed into other forms, such as heat and light. Such, for example, is the result of the impact of flint and steel; and in the birth of new stars, which are probably due to the collision of two cosmic masses, we have the same truth illustrated on a large scale. When the impinging bodies suffer no permanent change of form, the problem becomes comparatively simple. The laws governing the impact of small masses have been known, more or less accurately, since the days of Wren and Newton. During the impact, which lasts a short but measurable time, the bodies become compressed, and then recover themselves if they are elastic. The mutual stresses called into play cannot affect the total momentum of the two bodies, which is the same before and after the impact. But there is always a loss of energy of translatory motion of the bodies; for an impact means a compression with a subsequent vibration, and the energy of vibration will ultimately be frittered away in the form of heat. Practically a considerable fraction of the energy is transformed, in the first place, into sound and other aerial disturbances.

In cases of direct impact in which the impinging bodies are not rotating, a very simple dynamical law is generally assumed to hold, which may be expressed thus: the relative velocity of separation after impact bears a constant ratio to the relative velocity of approach before impact. This is the law which holds very approximately for the familiar case of a falling ball rebounding from a horizontal surface. The ball and earth constitute the pair of impinging bodies, and the relative velocities before and after impact are simply the observed velocities. Let the ball fall from a height H and rebound to a height h . The velocity just before impact is given by the formula $v^2 = 2gH$, and the velocity just after by the formula $v'^2 = 2gh$, where g is the acceleration due to gravity. This gives $v/v' = \sqrt{h/H}$, and suggests a simple experimental method for calculating the ratio $\frac{v}{v'}$, which is

known as the coefficient of restitution. In many cases the coefficient of restitution is not constant, but generally diminishes as the velocity of impact increases. The following, given by Tait, is one among many cases showing the same characteristics. It is the case of vulcanized india-rubber impinging on a steel plate—the first column (H) giving the height, in millimetres, from which the body falls; the second (T) the time of duration of the impact, in seconds; and the third (e) the coefficient of restitution:—

H	T	e
1219'2	0'0075	0'709
510'6	0'0087	0'794
283'5	0'0093	0'821
163'6	0'0095	0'819

Hertz investigated mathematically the conditions of impact of two elastic spheres, and calculated that the time of duration of impact of two iron spheres 50 mm. in diameter colliding with a relative velocity of 10 mm. per second was 0'00038 second. This result has been verified by experiment. The collision of long bars is a different problem from that of two spheres; for in their case waves of compression and dilatation are set up, which pass to and fro along the bar in times which are comparable with the duration of impact. See Tait, 'On Impact,' in *Trans. Roy. Soc. Edin.* (1890, 1892), or *Scientific Papers*, vol. ii. When the colliding spheres are rotating, as is usually the case with billiard balls, or when they collide obliquely, friction comes into play, and the dynamical problem becomes much more difficult. It is generally

assumed, too, that there is no slipping, so that at the instant of separation the points in contact have the same tangential velocities.

Impatiens, a genus of plants belonging to the order Geraniaceæ, mostly bearing showy axillary flowers with four petals. The common balsam (*I. balsamina*) is a well-known greenhouse annual; as also are *I. flaccida*, which bears purple flowers in June, and *I. Jerdonia*, which bears large flowers coloured yellow, green, and red. The last species requires a peaty soil in a hanging basket. The hardy annual species are easily raised from seed, and thrive in a warm, light soil.

Impeachment. Any person may be impeached for any crime, but that method of trial has been practically restricted to high treason and high crimes and misdemeanours. The last instance was that of Henry Dundas, Lord Melville, in 1806. First, a member of the Commons, after stating the high crimes of the accused, moves that he be impeached. If the motion is agreed to, the mover is ordered to go to the bar of the Lords to impeach the accused, and acquaint them that the Commons will exhibit 'particular articles against him, and make good the same.' These articles are drawn up by a committee and sent to the Lords. The accused puts in a reply, and the Commons may send in a replication. Members of the Commons are appointed managers to act as prosecuting counsel, and the case is tried by the peers. At the end of the trial the junior peer is required to answer first—'Guilty, or Not Guilty, upon my honour.' On a verdict of guilty, judgment cannot be entered against the accused till demanded by the Commons. No pardon under the great seal can be pleaded to an impeachment, but after a conviction the crown may pardon. When peers are impeached for high treason, the lord high steward, who is appointed for the occasion, presides at the trial. See *May's Law and Usages of Parliament* (10th ed. 1893). See also WASTE.

Impenetrability, a property believed to be characteristic of all kinds of matter, in virtue of which it is impossible for two different portions of matter to occupy the same space at the same time. The property is easily recognized in relation to ordinary tangible materials, such as stone, metal, liquid, and even air. The interpenetration of different kinds of matter, as in diffusion, solution, and the formation of chemical compounds, does not do away with the property of

impenetrability; it simply leads us to connect the property with the ultimate particles or molecules or atoms of which all matter is believed to be constituted. Kelvin has recently pointed out that we need not necessarily postulate impenetrability in regard to the fundamental atoms; for if these are simply conditions or modes of motion in the ether, it is quite conceivable for two such to coexist simultaneously in the same place.

Imperial Federation. In 1884 a conference was held in London, with W. E. Forster in the chair, which resulted in the foundation that same year of the Imperial Federation League. The first conference of representatives of self-governing colonies took place in the jubilee year 1887, when an agreement was arrived at by which the Australian colonies undertook, under certain conditions, to contribute £126,000 a year towards the maintenance of the royal navy. In 1892 a committee of the league was specially appointed to carry out Lord Salisbury's suggestion that a definite scheme of imperial federation should be submitted to the government; and its recommendations were that the colonies should be invited to take a share in the cost of imperial defence, and that a council of the empire should be established to deal with questions of defence and foreign policy. In 1893 the league was dissolved, and the Imperial Federation (Defence) Committee was formed, with the object of promoting the policy recommended by the special committee referred to. In the same year the second colonial conference was held, under the presidency of Mr. Chamberlain, the direct fruit of which was the offer by Cape Colony to the Admiralty of an ironclad. At the same time Natal offered to supply 12,000 tons of coal annually at Durban, free of charge, for the use of ships of the royal navy. In 1899 the Parliament of the Cape went further than their offer of the jubilee year, and voted a sum of £30,000 to be paid annually towards the navy, without condition or bargain of any kind. The great outburst of enthusiastic loyalty provoked in the self-governing colonies by the South African war led to another step forward being taken in 1902, when the presence of the colonial premiers in London for the coronation of King Edward VII. gave an opportunity for a third conference between them and the British government. The most striking results of this conference were the following offers of assistance towards the defence of the empire: Cape Colony, £50,000 per annum to the main-

tenance of the navy, without conditions; Natal, £35,000 per annum to the general maintenance of the navy, without conditions; the Australian Commonwealth, £200,000 per annum for an improved Australasian squadron, and the establishment of a branch of the Royal Naval Reserve; Newfoundland, £3,000 per annum (and £1,800 as a special contribution to the fitting and preparation of a drill ship) towards the maintenance of a branch of the Royal Naval Reserve of not less than six hundred men; New Zealand, £40,000 per annum for an improved Australasian squadron, and the establishment of a branch of the Royal Naval Reserve. Sir Wilfrid Laurier informed the Admiralty that the Dominion government were contemplating the establishment of a local naval force in Canadian waters, but that they were not able to make any offer of assistance analogous to those enumerated above. Canada has, however, now (1905) taken over the defence of the two important naval stations of Halifax and Esquimaux.

Imperial Institute of the United Kingdom, Colonies, and India, erected and endowed as the memorial of the jubilee (in 1887) of the reign of Queen Victoria, was transferred to the control of the Board of Trade, by Act of Parliament, in 1902. The work of the Imperial Institute is to display and to illustrate the natural resources and industries of the colonies and India; to promote, by scientific and technical investigation, the commercial utilization of the raw materials of the empire; and to supply special information concerning the colonies and dependencies of the empire and their resources. The institute buildings are at S. Kensington.

Imperialism. The word imperialism has as many meanings as the word empire. These meanings, which may vary at different times and in different countries, are mostly traceable to the history of ancient Rome. The Roman empire was very extensive and almost world-wide. It was not a single state, but a collection of states, as is modern India; it was the result, in large measure, of deliberate aggression and conquest; it was the substitution of despotism, however disguised, for the rule of a republican oligarchy; and it was established by a successful military leader, as was the French empire by Napoleon. Most of the ideas, sinister and the reverse, which cluster round the terms empire and imperialism are derived from those characteristics of the government of Rome as established by Augustus and

his successors. But in modern usage two meanings have emerged into special prominence, and it is in one or the other of these that the word imperialism is usually employed by politicians and journalists in the present day. One meaning is that of extended rule over various and often distant regions of the earth; the other is the desire to federate or in some way to unite with the parent country these distant colonies or dependencies. In the former sense the word may be used in several countries; in the latter it is peculiarly applicable to what is called the British empire.

It has been said that 'nationality' was the dominant word of the 19th century, and that 'imperialism' is destined to be the dominant word of the 20th century. If the dates are loosely construed, there is some truth in this saying. For sixty years after the treaty of Vienna, in 1815, European history was dominated by a struggle to assert the principle of nationality against the limitations imposed upon it by that treaty. The two great triumphs gained in this struggle were the union of Italy and the union of Germany. Since that victory was gained, there has been a more or less sustained effort on the part of European states in the direction of colonial expansion. England already possessed an extensive empire. Spain and Holland, which still possessed the relics of an empire almost equally vast, were incapable of further growth. Russia, checked in her southern advance by the Crimean war, began to absorb in resistless marches the territories of Central Asia, and by the treaty of Peking in 1868 succeeded in founding a great arsenal at Vladivostok in the far East. But it is about 1880 that the real advance of modern imperialism begins. France, under Jules Ferry, sought compensation for its recent humiliation at the hands of Germany by deliberately adopting an aggressive colonial policy in N. Africa and in Tong-king and Siam. Bismarck not only encouraged France in a policy which might arouse the jealousy of Great Britain, but also sought to direct German emigration for the strengthening of German interests by securing such African possessions as Damaraland, Tongaland, Namaqualand, with part of New Guinea, the Kameruns, and certain islands in the Pacific. Italy, under the ambitious guidance of Depretis and Crispi, neglected pressing difficulties at home to send expeditions to the Red Sea coast, where the occupation of Massowah led to a disastrous war with Abyssinia. The writings of Captain Mahan on sea power

had great influence in directing attention to the true foundation upon which colonial power had been built up, and all the states which had embarked in the race of expansion have set themselves to develop their naval strength. Even the United States of America, which seemed to have ample territories at home for its population, has been launched on an imperialist policy by its successful war with Spain, which has given it possessions in the W. Indies and in the Philippines.

These actions on the part of neighbouring states have exerted a profound influence upon thought and conduct in Great Britain. In the middle of the 19th century British colonial policy had been dominated by the ideas which found their most forceful exponents in Cobden and Bright. The old policy of fostering colonial trade with the home country by differential duties was deliberately abandoned, and the self-governing colonies were allowed to adopt protective measures even against exports from Great Britain. The contention that trade should be allowed to find its own natural direction seemed to put an end to any overwhelming mercantile interest in the maintenance of old colonies or in the acquisition of new ones, and the progress of Canada and Australia in the direction of independence was not only watched without misgivings, but was actually welcomed as likely to relieve us of burdensome responsibilities. But when the great powers of Europe began to embark on a policy of territorial acquisition which brought them into rivalry with ourselves, when Russian advance threatened the security of India, when the maritime communications with our colonies and dependencies were seen to be in danger of interruption, and when the unoccupied territories of Central Africa seemed to be thrown open to competition, a wholly new estimate of the value of empire began to force itself upon people's minds. The first writer to formulate the vague doctrines of imperialism was Professor Seeley, whose *Expansion of England* is a landmark in the history of modern political thought. Disraeli was among the first politicians to grasp the value of the new ideas. On the Liberal side men were found, like Mr. W. E. Forster and Lord Rosebery, who endeavoured to raise imperial interests above the contentions of party politics. In place of the doctrine of *laissez-faire* in colonial policy, there arose a desire to devise a scheme of federation which should not only avert disruption, but should bind the empire into some

measure of permanent cohesion. Distance, difficulty of communication, and the divergent character and interests of communities placed in such scattered parts of the globe, seem to preclude any measure of direct federation by means of a central imperial assembly or parliament. But some progress has been made in the way of cheapening and improving postal and telegraphic communication within the empire, in the holding of periodic conferences in which the representatives of the self-governing colonies meet ministers at home to debate questions of imperial interest, and in the formation of a committee of defence in which colonial members may gradually come to have a permanent place. One of the favourite aims of modern imperialism is to strengthen the commercial intercourse between the different parts of the British empire. Imperial free trade, which is the ideal of some enthusiasts, is rendered impracticable by the determination of the self-governing colonies to protect their own industries against competition from any quarter. Mr. Chamberlain has proposed as a substitute to revive the old system of preferential trade; and some of the colonies are willing to grant a certain measure of preference, either by lowering the duties on British products, or by raising those levied upon imports from non-British countries. But the great difficulty in the way of the proposal, apart from the question whether it would produce the desired result of increased imperial unity, is that such a system would compel Great Britain to return to a policy of protection, and to impose taxes upon the foreign import of the necessities of life.

Imperial Nursing Service.

As a result of the experience gained in the S. African war, it was decided to reorganize the nursing service of the army, and accordingly a new body was formed, termed Queen Alexandra's Imperial Nursing Service. This supplies the nursing staff for the whole of the army, and works in conjunction with, and, to a certain extent, under, the orders of the Royal Army Medical Corps, of which it forms the natural complement.

Imperial Service Order, a decoration conferred on members of the civil service throughout the empire for long and meritorious service. Only members of the administration or clerical branches are eligible as companions, and their number must not exceed 425. The order was instituted by King Edward VII. in 1902.

Imperial Yeomanry. See ARMY, BRITISH.

Impérieuse, a British first-class cruiser (8,400 tons), launched in 1883. The first ship of this name in the navy was a French prize captured in the Bay of Spezzia by the *Captain* on Oct. 12, 1793.

Impetigo Contagiosa is a contagious skin disease characterized by the formation of pustular vesicles, which run together and become covered by a crust of dried discharge. The disease is generally confined to the face and head. Treatment consists in softening and removing the crusts by poultices, and in the subsequent application of mild mercurial lotions and ointments. Cleanliness is the great preventive and cure.

Impey, SIR ELIJAH (1732-1809), chief-justice of Bengal, was born at Hammersmith, near London. On the establishment of a supreme court of justice in Bengal in 1773, Impey was appointed the first chief-justice. From the first he acted in complete agreement with Warren Hastings. In 1775 he presided at the trial of Maharajah Nand Kumar on a charge of forgery, who was found guilty, and sentenced to death. In July 1777 he was called upon to settle a dispute between Warren Hastings and Sir John Clavering, as to the resignation of the former, and decided in favour of Hastings. Three years later the local courts were put under European control, and Impey became president of the central court, with appellate and administrative authority over all. In 1783 he was recalled, and impeached for his conduct in the trial and execution of Nand Kumar, but was acquitted. He resigned the chief-justiceship in 1789. See *Life* by his son (1846).

Imphal. See MANIPUR.

Implacable, a British first-class battleship (15,000 tons), launched in 1899. This name was given to the French *Duguay Trouin*, captured in 1805, and in 1904 still serving as a training ship for boys at Devonport.

Implements and Machinery, AGRICULTURAL, may be classified, according to the sequence of agricultural operations, as follows:—Implements used in (1) preparing the soil for crops; (2) in sowing seeds or manures; (3) in cultivating growing crops; (4) in harvesting or securing crops; (5) in preparing crops for market; (6) in preparing crops for home consumption; (7) dairy implements and utensils; (8) implements required for estate work.

Implements used in preparing the soil for crops.—These include ploughs, cultivators, harrows, rollers, land pressers, and diggers, all of which have to a great extent preserved their original

form, although they have been adapted to steam, and probably may be to electric motor power. The plough turns the furrow completely over, and exposes a fresh surface to atmospheric action, and is therefore the most thorough of all cultivating implements. Cultivators, grubbers, or scarifiers tear and pulverize the soil by means of curved teeth, and, when worked by steam, in many cases supersede the plough. Harrows are used to render the surface fine for the reception of the seed, and to cover it; but the heavier forms do similar service to that of cultivators. Rollers are used to break clods, but still more to consolidate the seed-bed after sowing, and to smooth the surface. They are plain, or toothed as in the Croukill, or formed of segments or rings as in the Cambridge, and vary in weight from the light wooden to the heavier iron toothed and ringed rollers. Pressers are composed of two or three heavy iron wheels, placed at such a distance from each other, on a frame, as to follow two or three ploughs, and press the furrows as they are turned over. The adaptation of these implements to steam power has given rise to many forms. Thus, Fowler's balance plough carries from eight to sixteen ploughs, half of which are in work, while the other half are suspended on the opposite side of the frame. At the end of the furrow the idle ploughs are lowered into work, and the working ploughs are hoisted out of work by the same movement. The powerful 7-tine cultivator is steered round the ends by the driver, and in both cases the steersman is seated on the implement. In the steam-digger spades or forks are affixed to a rotary drum slung behind an engine, which travels over the land. The object is to produce a tilth or seed-bed in one operation. The drawback of this system is, that the pulverization of the ground is unduly precipitated, and the beneficial effects of changes of temperature are lost.

Implements used in sowing seeds or manures.—These include various forms of drills, broad-cast sowers, seed-barrows, and manure distributors. They are all designed to supersede hand-sowing, but they are neither more rapid nor cheaper than that method. Drills deposit the seed in rows, below the surface, by means of hollow coulters; while broad-cast machines and seed-barrows scatter the seed on the surface, or on ordinary or pressed furrows, and in the two last cases the seed falls into seams or grooves and the plants come up in rows. Drills include water-drills, dry-

drills, corn-drills, turnip-drills, clover-drills, bean-barrows, etc.

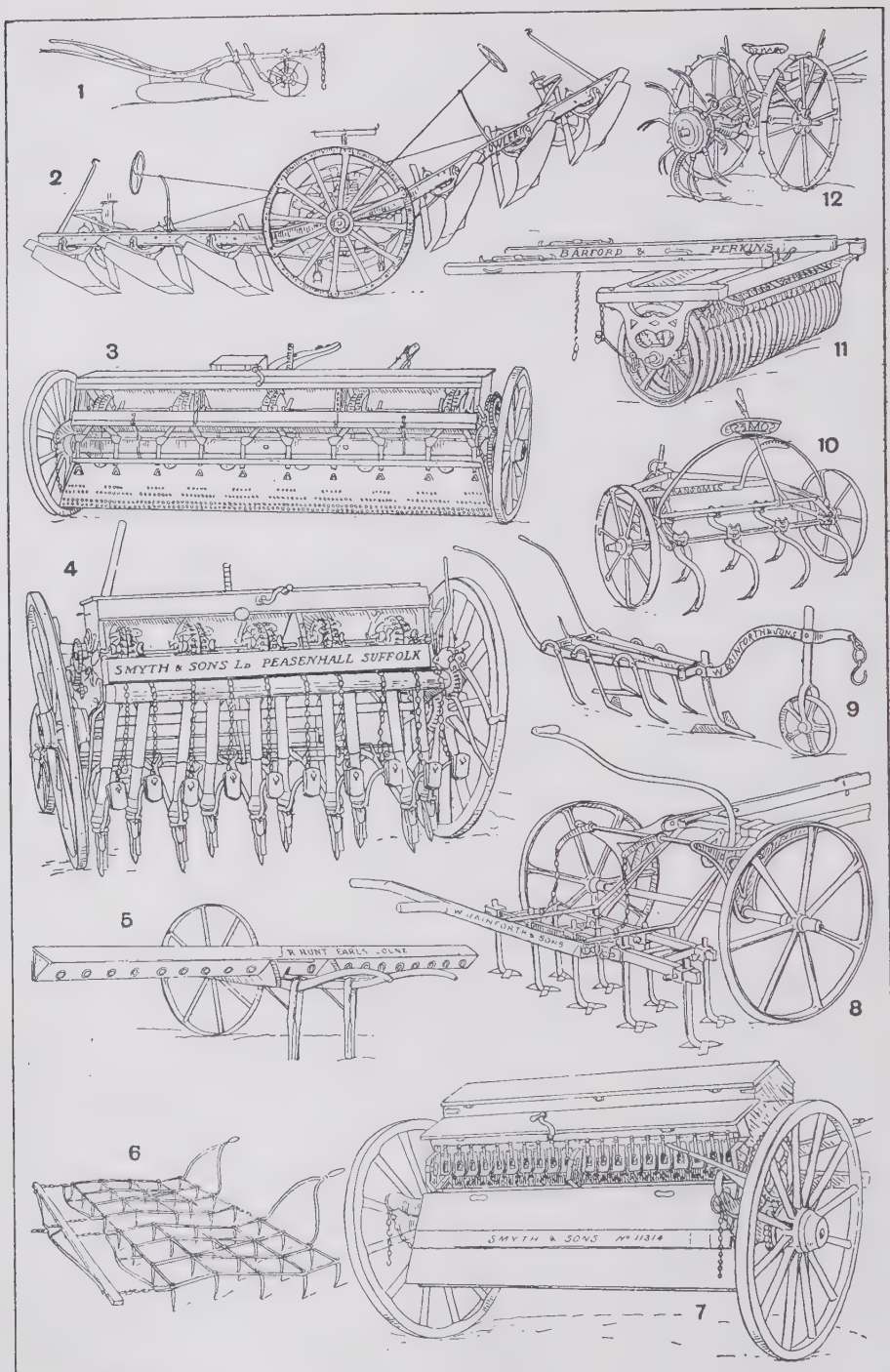
Implements used in cultivating growing crops.—Besides hand-hoes, which are largely employed, this class includes various forms of horse-hoes. They vary from one-row scufflers for potato cultivation or root crops grown on the ridge system to multiple hoes for taking three or more drills of turnips, and corn-drills, which carry about thirteen hoes, constructed to follow a 13-coulter drill.

Implements used in harvesting or securing crops include harvesters or self-binders, reaping machines, mowing machines, loaders, stackers, swathe-turners, horse rakes, and hay-tedders. The self-binder delivers its sheaves, neatly tied with string, at the rate of thirty a minute, and will cut and tie up an acre of corn in an hour. There are also several kinds of mechanical potato-diggers and root-toppers in use.

Implements used in preparing crops for market.—The threshing machine stands at the head of the list in this class. A good modern threshing machine separates and delivers simultaneously the straw, the cavings, the chaff, the head-corn, the tail-corn, and seeds of weeds. In many modern threshing machines a chaff-cutter is attached, which delivers the cut straw into bags; or an apparatus is added which ties the straw in bundles. In others, the corn is delivered at the proper weight into sacks ready for delivery. The finishing threshing machine combines the operation usually performed by the winnowing machine, the hummeller, and the corn-screen. The inequalities of sample, or rather of bulk, in a largerick cause many farmers to prefer a single-blast machine, and the bulk of the corn is then turned over on a floor and rendered equal in character. It is then winnowed or screened, and weighed up for market.

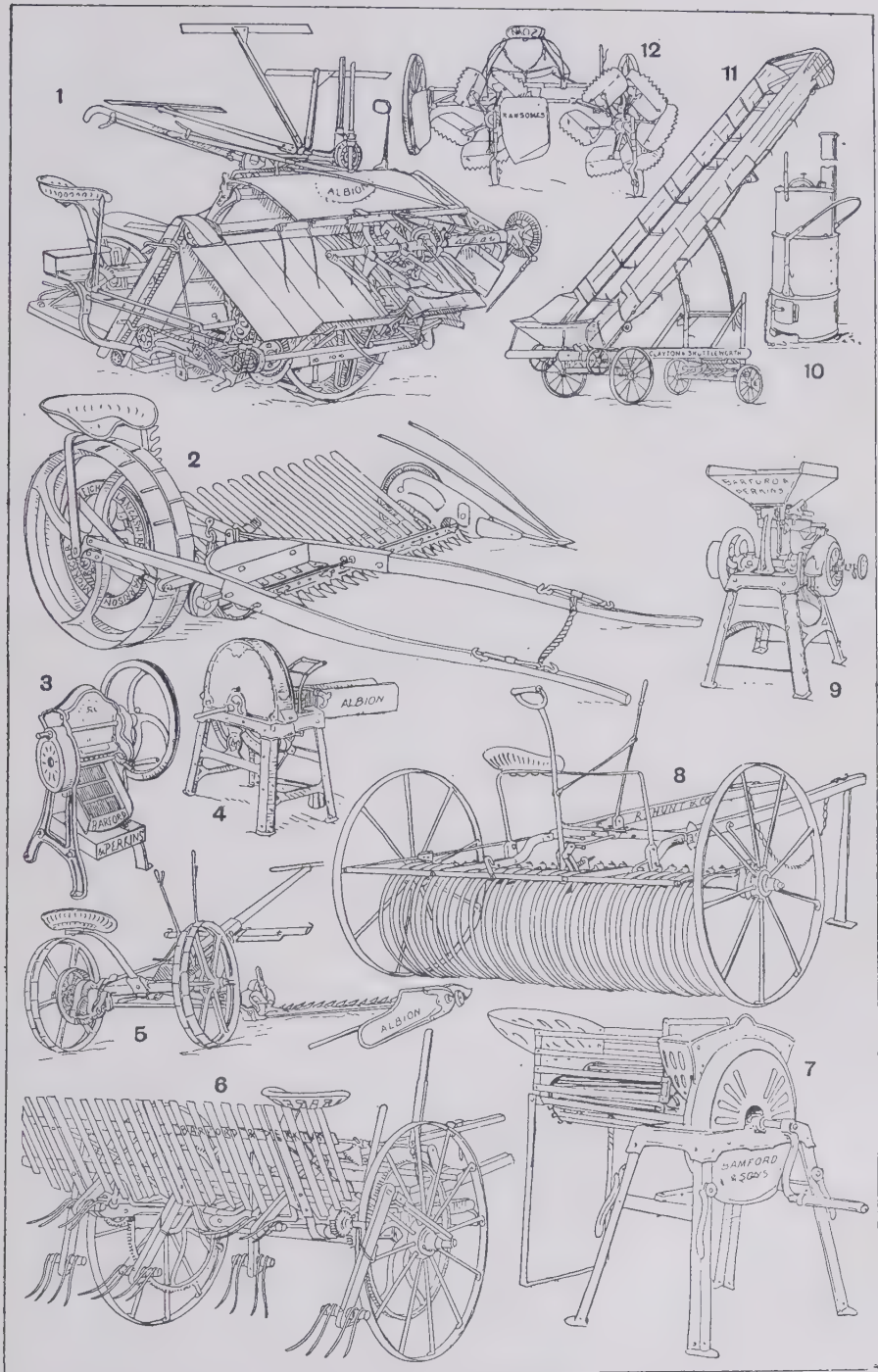
Implements used in preparing crops for home consumption.—These include grist-mills, kibblers, bruisers, chaff-cutters, boilers, root-pulpers, root slicers and shredders, and oil-cake breakers. They are best arranged in connection with a fixed steam or oil engine, to drive a shafting with pulleys placed at intervals; each pulley carries a belt, which is passed over a corresponding pulley on each instrument. See *Scott's Barn Implements and Machines* (1884), *Malden's Farm Buildings and Economical Agricultural Appliances* (1876), *Martin's Farm Appliances* (1903), and *Malden's Tillage and Implements* (1891).

Dairy implements and utensils are described under DAIRYING and CHURNS.



Agricultural Implements.—I.

1. Farm plough. 2. Fowler's balance plough. 3. Broadcast sower. 4. Corn drill. 5. Seed barrow. 6. Harrow. 7. Manure distributor. 8. Horse hoe. 9. Scuffler. 10. Cultivator. 11. Roller (Cambridge), with cleaner. 12. Potato digger.



Agricultural Implements.—II.

1. Self-binding reaping machine. 2. Reaper (manual delivery). 3. Oilcake breaker. 4. Chaff cutter. 5. Mower. 6. Hay tedder. 7. Pulper, with root cleaner. 8. Horse rake. 9. Grist mill. 10. Boiler for steaming food. 11. Straw elevator. 12. Swath turner.

Implements required for estate work.—These, which are required on large estates, include brick and tile making machines, saw-mills, lime-burning apparatus, drainage-ploughs, and various implements connected with woods, quarries, and mines.

Imports and Exports. The distinction between imports and exports only applies to a particular country or countries. The material commodities that a country receives are its 'imports'; those that it sends out are its 'exports.' From a general point of view, every export is also an import, just as each emigrant is an immigrant. The study of imports and exports is a prominent part of the subject of foreign or international trade. Some particular features may, however, be noted here. (1.) There is a necessary connection between the value of imports and that of exports, for the former are paid for by the latter. Other elements come into the account between countries, but the commodities interchanged make the largest item. (2.) The process of interchange is often a circuitous one, since a country may pay by exports to countries other than those from which it receives its imports, the latter obtaining equivalent imports from those 'other countries.' (3.) In the course of national growth the constituents of imports and exports, as also their relative proportions, change. The general tendency is towards greater diversity in character, crude materials being more largely imported and finished goods exported. The imports tend to increase relatively to the exports, owing to the investment of capital abroad, and, in some cases, the increase of the carrying trade. (4.) The interpretation of import and export statistics is extremely difficult. Values taken by themselves are misleading; they require to be checked by reference to quantities. Much care is needed in order to make the proper comparison between different countries. Rate of growth in exports or imports is not a complete test of commercial advance; the relative amounts must be considered as well. The following table gives the value of the imports and exports of four principal countries in millions of pounds sterling:—

	Imports.	Exports.	Total.
United Kingdom (1904)	551	371	922
United States (1903-4)	203	300	503
Germany (1903)	299	249	548
France (1903)	192	170	362

See INTERNATIONAL TRADE, FREE

TRADE, PROTECTION, TARIFF REFORM, RETALIATION, FREIGHTS, TAXATION. See also Sir R. Giffen's 'The Use of Import and Export Statistics,' in *Essays in Finance* (2nd series 1886, pp. 132-239), reprinted in *Economic Inquiries and Studies*, vol. i. pp. 232-381; and 'The Excess of Imports,' in *Statistical Journal*, vol. lxii., pp. 1-69; also Mayo Smith's *Statistics and Economics* (1899, ch. viii.); Bowley's *Elements of Statistics* (2nd ed. 1902, pp. 63-70); Bastable's *International Trade* (4th ed. 1903, ch. iv.); Mulhall's *Dictionary of Statistics* (1899); and the various parliamentary papers issued annually and periodically, notably the annual statement of the trade of the United Kingdom.

Impotency implies a temporary or permanent condition of the male generative organs which prevents the sexual act. The term should be distinguished from sterility, which does not prevent sexual union, but renders it unfruitful. Impotency may result from malformation, from certain diseases such as diabetes and albuminuria, from affections of the spinal cord, or from general debility caused by overwork, old age, anxiety, sexual excesses, etc. Treatment must depend upon the cause, but in a great many cases sexual rest, liberal feeding, and a healthy open-air life bring a speedy and complete cure. Tonics and cold baths are also of service, but quack remedies should be avoided, as, of those which are not inert, the most are irritant and pernicious.

Impound. A judge may order documents in court, the loss or destruction of which might defeat the ends of justice, to be impounded in the custody of the court; they can then be inspected by the director of public prosecutions, or by private persons upon obtaining an order signed by two judges. See also POUND.

Impregnable, a British 121-gun ship (6,557 tons), launched in 1860, and serving (1904) as a training-ship for boys at Devonport. Since 1786 there have been vessels of the name.

Impressionism, Impressionists. There are no words more common in modern art criticism; but it is not easy to ascertain what impressionism is and is not, or who the impressionists are, why they are thus designated, and what are the central ideas which distinguish painters so unique in method and manner as Manet and Delacroix, Claude Monet and Monticelli, Degas and Renoir, Bessard and Raffaelli, Carrière and Forain, Whistler and Pissarro, Guthrie and Steer.

With many people, impressionism stands for the bizarre and

the incomplete; with others it stands for a vogue, the verbal colour of an artistic tendency—a convenient because a vague designation. For some it means the experimental, the more or less brilliant tentative of a temperament which is feeling its way, and whose expression is uncertain and variegated. Among painters themselves the word is not held in honour. A few artists and students know that the fundamental principle of impressionism is as old as art itself, and that it is only in certain conscious directions that some modern painters and groups of painters may be distinguished as impressionists. Giorgione was as much an impressionist as Monet, Tintoretto as Delacroix; and if the name be denied to Rembrandt or Velasquez and granted to Turner and Whistler, it must be accepted as not less vague and unsatisfactory than 'realism,' 'naturalism,' and most other *isms*, the coinage of minds at fault. Even those who can indicate the leading living representatives of impressionistic art in its several phases, find it easier to do so than to justify the choice, to demonstrate a fundamental unity, and to explain seemingly essential divergences in method and manner. At home, we have the Glasgow school, the New English Art Club, Whistler and Sargent stand for America, though their genius is not of any country and their accent is cosmopolitan. In French art, how many names occur from Claude Monet to the latest New-Salonist. Among the Hollanders one thinks of a typical impressionist of the imagination such as Matthys Maris, of the actual such as Tholen; in Swedish art, of Anders Zorn; in Norwegian art, of Thaulow; in Danish art, of Viggo Johansen; in Russian art, of Ilya Repin; in Italian art, of Michetti and Pietro Fragiaco; in Spanish art, of Francisco Pradilla. These are but representative names, for each is a captain in the conquering army whose watchword is 'Modernity,' and whose banner is 'Impressionism.' As to the designation now so familiar, it was not, as commonly stated, formulated by Courbet or any other, or by the group of innovators collectively. One day Claude Monet exhibited a picture called *The Impressionist*; the title was at once taken up, and from that day the painters constituting this small group, and the great number to be classed with them now, were and are called impressionists.

The group, or movement as it is commonly called, as such owed more to Courbet and to Manet than to any other. Yet when we consider the work of the impres-

sionists from Monet and Renoir to Whistler and Degas and Carrière, we cannot fail to be struck by the fact that both in method and manner it has apparently little directly in common with the Flemish realism of Courbet and the formal realism of Manet; that the artistic aim of these men is apparently a distinct aim; and, colourists as they all are first and foremost, that they would appear to be the natural successors of Delacroix and the men of his group, from Géricault to Fromentin, from Marilhat to Bida.

The first real victory of impressionism was in the revolutionary excitement caused in the French art world by the representative posthumous exhibition of Manet's work in 1884. The first official recognition was when the ministry of fine arts availed itself of the liberality of the artist and connoisseur Caillebotte, and in 1897 opened the Salle Caillebotte, or Salle des Impressionistes, in the Luxembourg national collection. Here the whole reach of contemporary impressionism (the word is admittedly too vague) may be studied, from Manet, with what seems to us his crude realism, to Monet, the modern high priest of the painting of light; from Sisley and Renoir to Marie Bashkirtseff; from Whistler to Sargent; and from Anders Zorn and his continental confrères to Guthrie and Lavery and others of the impressionistic school of Glasgow. A first acquaintance with the paintings in the Salle Caillebotte will doubtless leave the uninformed visitor with several disillusionings, for tentative work is generally lacking in finality, and therefore in serenity, which is the atmosphere of the great art of the old masters; and there are very few pictures here which have the distinction and finality of Whistler's *Portrait of my Mother*, for example. Many visitors, too, will be conscious of a bewilderment that what seems so natural should have excited so much bitter anger and unreasoning abuse. But the student will gather from this strangely dissimilar company that impressionism, as the best French critics now agree, resolves itself, despite its divergences, into three ideals—the reproduction of the real (actuality); the quest of the beauty and mystery of light; the effort to seize some instantaneous aspect of life, and faithfully to reproduce that vivid impression, as distinct from the mere reproduction of this or that detail or series of details. For the first, Manet stands representative; for the second, Claude Monet; for the third, Degas or Renoir. If

unquestionably Monet, Renoir, Pissarro, Jongkind, Cézanne, Sisley were influenced in two directions by Courbet and Corot—by the one towards actuality, and by the other towards the painting of light and atmosphere—their chief precursor was Delacroix, since the time of Rembrandt the most potent individuality in French art. Through Delacroix they arrived at the knowledge of what had already been achieved in England by Turner, whose genius was a revelation to Delacroix, already profoundly influenced, as the great French romanticist had been, by Constable. In a sense, modern art with its impressionistic savour had its recognized origin in England with Turner and Constable. In the development of modern landscape, and above all of the great naturalist school inaugurated in France by Huet, Millet, Rousseau, Corot, Daubigny, Diaz, the foremost name as pioneer and captain is that of the great Englishman, Thomas Constable.

Manet was the first great realist in modern French art. What he or others for him called impressionism would not now so be characterized. It is true, actuality is a fundamental principle with the impressionists, and Manet's ideal was of actuality; but in his intense earnestness he strove (and taught others to strive) for an ideal of reproduction rather than of interpretation, for a convincing literality rather than a persuading synthesis. He was an artist, and again and again transcended his own theories. It is impossible to overlook his personal and artistic influence in the development of modern impressionism; yet his work (with few exceptions) now seems, if not crude, at least tentative. There seems a gulf between him and Claude Monet, though they were friends and colleagues, and the younger was a follower of the elder's daring lead towards actuality. Courbet, again, would not now be called an impressionist. He was so called because he discarded tradition and convention, saw for himself, painted only what he saw, what he felt, what he believed in, and painted in his own way only. He was a potent revolutionary force. Monet himself has never failed to recognize how much he and his confrères owed to the vigorous realism of Courbet. It was this actuality, this realism, of Courbet and Manet which led to the potency and extent of the great movement of modernity in contemporary art; but there is no other direct connection between these two artists and Claude Monet and the neo-impressionists. Their real leader is Eugène

Delacroix. Even at the meetings of the Café Guerbois in the Avenue de Clichy, where Claude Monet was a recognized leader, and where were wont to assemble Renoir, Cézanne, Pissarro, Degas, Fantin Latour, Jongkind, Bracquemond (as, a little later, Courbet, Raffaelli, Sisley, Forain, etc.), Manet was always listened to with admiration, with reverence, but as an intellectual pioneer rather than a leader along the lines actually followed. He had, indeed, little preoccupation with the problems of light and atmosphere, which are at once the delight and despair of Monet and the 'luminarists,' and have been since Delacroix.

The first public sale by the luminarists or impressionists was in the spring of 1875. Every picture went for ludicrous sums. So bitter was the hostility that police precautions had to be taken. Yet these painters were but following the example of Rembrandt, of Delacroix—seeking to paint light, to reveal a new and beautiful world in the wonder and glory of sunshine, and to do so by discarding dark and obscure colours and adopting those, radiant, living, which came nearest to the prismatic hues. Twenty-four years later, one of the greatest events in the art world of Paris was the Choquet sale, when works of the once derided painters were sold at high prices. As at the Vever sale two years earlier, Monet must have had some bitter thoughts; on that occasion one picture of his fetched 21,500 francs, for which in the 'seventies he could not have got £20, or, mayhap, half that amount. When Manet died, in 1884, his fine portrait of *Claude Monet in his Studio* fetched no more than £6. At the Choquet sale the same canvas was eagerly bought at 10,000 francs.

The impressionists, or rather the neo-impressionists, are often spoken of as *pointillistes*; but this is a mistake. They depend far more on modelling of the mass than in lines and spots. Because a painter such as Henri Martin is pre-eminently a *pointilliste*, and Henri Martin is an impressionist, it does not follow that impressionism is, technically speaking, *pointillisme*. The foremost authority on, and one of the chief exemplars of, the principles of the neo-impressionists, states explicitly that this mediocre process of pointillism has nothing in common with the aesthetics of painter-impressionists, nor with the technique of *division* which they employ. He adds: "The impressionist does 'point' (that is, paint in spots), but he 'divides.'" Now to *divide* is to secure all the benefits of lumi-

ness, of coloration, and of harmony by (1) the optical mixing of separately pure pigments (all the tints of the prism and all their tones); (2) the separation of the diverse elements (local colour, lighted colour, their reactions, etc.); (3) the equilibrium of these elements and their proportions according to the laws of contrast, of de-gradation, and of irradiation; (4) the choice of a touch proportioned to the dimensions of the picture. Technically the sole aim of the impressionist is to obtain a maximum of colour and light, and to attain to this desideratum he will use pure colours only—so far as practicable, the pure, radiant prismatic colours. In a word, Delacroix, Monet, and the neo-impressionists concurred in the single dominant aim—to give to colour the greatest possible luminosity and effect.

In this connection it might be well to touch upon the extraordinary, only partially realized influence of modern Japanese art on the impressionists from Manet and Whistler to Degas, and on the seekers of light from Monet to Sisley. The exhibition of work at the Exposition Internationale of 1867 by these great artists Hokusai (that supreme naturalist of the East, who died at the time when Millet had his *Winnowers* and Courbet his *Stone-breakers* on the easel), Hiroshige, and Outamaro (the Menzel and Millet, the Corot, and the Whistler of Japan), and many others, and the advocacy of the De Goncourt brothers, had an effect so wide and deep as to be paralleled only by the effect on American art when Durand Ruel held in New York and Boston his first and second exhibitions of the Barbizon men and the later impressionists of light and actuality.

There are with this vital school of modernity four main directions in expression. Their exemplars are:—(1.) Those who are concerned with the spiritual and poetic interpretation of nature and the primitive life of man in nature—Huet, Millet, Rousseau, Daubigny, Troyon, Diaz, Corot, Dupré, Pointelin, Bastien-Lepage, to select ten representative names. (2.) Those who are concerned with the visionary and imaginative and spiritual interpretation of life of the mind and soul, either expressed in pictorial symbolism, as with Gustave Moreau, or in decorative beauty, as with Puvis de Chavannes, or with spiritual revelation, as with Eugène Carrière. (3.) Those who are concerned solely with 'the veritable art of the thing seen,' of whom Gustave Courbet is the leader. Then (4) there are those who are concerned with the *vérité*

vraie as much as Courbet was; but with the effort to recapture the fleeting line and curve, the fugitive beauty in the brilliant moment, the resting light, the sudden passage of light, drifting shadow, the *tout ensemble* of motion and light, the breath, the thrill, the importunate emotion of life—Géricault, Delacroix, Decamps, Fromentin, Marilhat, Bida, Monet, Renoir, Pissarro, Cézanne, Sisley, Degas, etc. Of course the truth lies with neither Courbet nor Moreau, for, as has been variously said a hundred times, in art there is no *vérité vraie*, but only a truth seen through a temperament. It is true, with Ingres, that art is form; it is true, with Delacroix or Claude Monet, that art is colour, the impassioned and individual reflex of the colour of life; it is true, with Courbet, that art is realism, and with Manet and with Bastien-Lepage, and with Degas; it is true, with Moreau, that it is the colour of the imagination; or, with Carrière, of the spirit; or, with Bernadé, of the nerves. One and all are true; but none alone is true, or even approximately true. That unity does not lie in the emotional life of expression which we call art, which discerns it; it does not lie in nature, but in the soul of man.

Impressment. In time of war, seafaring men, and those engaged in boats on rivers, between fifty-five and eighteen years, are liable to be compelled to serve in the navy. Every person is exempt from impressment for the first two years of his going to sea, and apprentices (on vessels) for three years from the date of their articles (The Exemption from Impressment Act, 1739). Men who have served five years in the navy are exempt for two years if discharged by the Admiralty, and for one if discharged on their own application (Naval Enlistment Act, 1835). No impressment is legal except on an Admiralty warrant issued to a naval officer after proclamation of impressment has been issued.

Imprisonment is a punishment distinct from penal servitude, and may be either with or without hard labour. Persons charged with criminal offences may be imprisoned until they can be brought before a magistrate, or until trial—not as a punishment, but for safe custody. (See BAIL.) The mode in which sentences of imprisonment are to be carried out is regulated by prison rules made by the Home Secretary, the Secretary for Scotland, and the General Prisons Board of Ireland. In making such rules, regard is had to the sex, age, health, industry, and conduct of the

prisoner. In England, prisoners not sentenced to hard labour are divided into three classes under the Prisons Act, 1898. Prisoners of the first division, or first-class misdemeanants, are allowed to maintain themselves, to receive their friends, and to follow their professions, subject to the restrictions necessitated by confinement. Prisoners of the second division are treated under special prison rules, are not placed in association with criminal prisoners, and are not compelled to wear prison dress unless their own clothing is unfit for use. The court may, if it thinks fit, having regard to the nature of the offence and the antecedents of the offender, direct that a prisoner be treated as an offender of the first or of the second division, and, without such direction, persons imprisoned for default in payment of a debt, or in default of distress to satisfy a sum of money adjudged to be paid by an order of a court of summary jurisdiction, and also persons imprisoned for default of entering into recognizances or finding sureties for keeping the peace, or for being of good behaviour, are treated as offenders of the second division, unless, in the case of the latter, there has been a conviction, or the court directs that they shall be treated as offenders of the first class. For nearly all serious offences the punishment of hard labour may be added to imprisonment; but in the case of minor offences the punishment is imprisonment without hard labour, and often the alternative penalty of a fine is imposed. With very few exceptions, two years is the maximum period imposed by statute law. See PRISONS.

Improprization. See APPROPRIATION.

Improvements, COMPENSATION FOR. See AGRICULTURAL HOLDINGS ACT.

Improvisation, the art of composing verses without previous preparation, and either with or without the accompaniment of a musical instrument. It was practised to some extent by the ancient Greeks and Romans, but is more particularly an accomplishment of modern Italy. In fact, the 'father' of the art is Petrarch (14th century). Among the more distinguished exponents of the art may be mentioned Marone, Accolti, Cristoforo, and Antoniani, all of whom flourished in the 16th century; Perfetti (1680–1747), who was crowned on the Capitol at Rome by Pope Benedict XIII.; the poet Metastasio; Corilla Olimpica, the original of Madame de Staël's Corinne, who also was crowned on the Capitol in 1776; then later Serio and Rossi, Syrici (1798–

1836), and Signora Mazzei. Outside of Italy the gift has been possessed by the Swedish poet Bellman, by Daniel Schubart and Hoffmann von Fallersleben in Germany, by De Pradelin France, and by De Clercq in Holland. Most great musical composers have been improvisers in their own special art, and so have some of the great pianists.

Imputation, a theological doctrine intimately related to the orthodox view of the atonement. The sin of Adam is said to be imputed to his posterity, who in him have incurred a guilt for which they are not personally responsible (original sin); and in a similar way the righteousness of Christ is imputed to those who by faith receive Him, though they have no merit of their own. Most modern reconstructions of the theory of atonement, however, regard the relation of the human race both to Adam and to Christ as something more substantial and intrinsic than a mere imputation. See The Thirty-nine Articles, Nos. 9 and 11, and works on the atonement.

Imus, tn., Cavité prov., Luzon, Philippines, 18 m. S. of Cavité. Pop. (1898) 14,675.

Inaccessible Islands. See TRISTAN DA CUNHA.

Inagua, GREAT and LITTLE, two of the Bahama Is., W. Indies, to the N. of the Windward passage between Cuba and Haiti. Great I. is 50 m. long by 25 m. broad, and has salt marshes; Little I. lies 12 m. to the N., and measures 8 m. by 6 m. Pop. of Great Inagua (1901) 1,453.

Inanda, dist., Victoria co., Natal, lying along the shores of the Indian Ocean, beyond the Umgeni R., with a population of 45,000.

In articulo Mortis, meaning 'at the point of death,' is a phrase sometimes used by lawyers, though it has no special legal significance. Dying declarations are admissible in evidence; but the question that arises is not whether the declarant was *in articulo mortis*, but whether he had given up all hope of recovery when he made the declaration.

Inca. See PERU—Ancient Civilization; QUICHUAS.

Inca, tn., prov. Balearic Is., Spain, 17 m. E.N.E. of Palma, Majorca; produces oil, wine, and almonds. Pop. (1900) 7,579.

Incandescence. A body is in a state of incandescence when it glows or emits light by virtue of its being at a high temperature. Incandescence varies greatly in degree, and is probably due to an increased rate of vibration of or in the molecules set up by mechanical force, chemical action, or the flow of electricity.

Incandescent Lamps. See ELECTRIC LAMPS.

Incandescent Light. Almost all practical methods of illumination depend on the incandescence of solid bodies, heated either by chemical action or by the resistance they offer to the passage of an electric current through them. Thus, in ordinary gas or candle flames the luminosity is probably chiefly due to incandescent carbon particles, set free and then strongly heated by the chemical action that is going on. The proportion of the energy evolved as light in such a case is but a small fraction of that given out as heat, and a successful effort has been made, primarily by Welsbach, to improve the ratio by substituting certain metallic oxides for the carbon as the incandescent body. In this case the gas or hydrocarbon vapour is burnt after admixture with air in a burner of the bunsen type, so that its flame is quite non-luminous and very hot. In this flame is placed a 'mantle' or conical hollow gauze of metallic oxides, prepared by igniting a loose cotton fabric of the required shape that has been impregnated with a suitable mixture of salts. Various mixtures of oxides have been used, generally of the rare earths, one of the most effective being a mixture of about ninety-nine per cent. thorium oxide with one per cent. of cerium oxide; though mantles without rare earths and consisting of aluminium and chromium oxides are also said to be employed. Great developments of incandescent gas lighting have taken place recently, mainly in the direction of improved mantles, using them in an inverted position, and using the gas under greater pressure.

Incantation is a term denoting a set form of words, sung, intoned, or spoken on certain occasions in the belief that it produces a specified supernatural effect. The enchanter or priest, in whom magical power is assumed to be vested, may pronounce a benediction as well as invoke a curse. Among the ancient Japanese *majinashi* signified the use of incantations and magic formulas to dissipate evil influences 'by the aids of the supernatural power of gods and Buddhas'; and the *Nihongi*, or *Japanese Record*, includes 'a reciter of mantras,' or Buddhist magic spells, among the holy men presented to the Japanese emperor by the king of Korea in the year 577 A.D. Probably the earliest known source of such spells is Akkadian, and the Chaldean Magi the chief adepts. The dominating position once occupied by the professors of this thaumaturgic art is testified to in the Book of Daniel, where Daniel himself becomes 'master of the

magicians, enchanter, Chaldeans, and soothsayers' of Babylon. Lenormant's *Chaldean Magic* (trans. 1878) contains many of their incantations, the echo of which is audible in later times and other countries. Interesting comparisons will be found in the Hungarian-Gypsy formulas garnered by Von Wilslocki, and in such works as Abercromby's *Magic Songs of the Finns* (1898). But although an incantation is essentially a sacred formula, the word has generally been applied disparagingly in recent centuries to the invocations of those whose religion differs from the speaker's, and it has become associated with suspicious if not actually evil designs. Gower, in 1390, refers to incantation as the characteristic method followed in necromancy. The mediæval Gaelic monks applied the terms *incantatores* and *magi* to the pagan priests who opposed St. Patrick and St. Columba. Without the chanted or the spoken word the Magian ceremonies were inefficacious. 'The malediction is the mainstay of witchcraft,' says G. G. Leland in his *Etruscan Roman Remains* (1892). And Shakespeare makes Hecate bid her witches 'now about the cauldron sing, enchanting all that you put in.' Similarly, Scott's Norna chants while she works her charms. At the present day incantations against diseases or other evils, and sometimes for guidance in the affairs of love, are frequently practised among European peoples; and in the ritual of many primitive races incantation still ranks as high as it did in ancient Chaldaea.

Incarnation, the act by which a supernatural being assumes a form of flesh; in Christian theology, the central fact of religion. Incarnations of the gods are common in Hinduism—e.g. Krishna; and the idea is altogether more characteristic of the Indo-Germanic world than of the Semitic. But the appearances of the 'angel of Jehovah' in the Old Testament (Judg. 13:3 and *passim*) prepare the way for the fuller and purer conception of the incarnation of the Divine Son or Logos as expressed in John 1:14, 'The Word was made flesh'; or in 1 Tim. 3:16, 'God was manifest in the flesh.' See Wilberforce's *Doctrine of Incarnation* (1882); also R. L. Ottley's *Doctrine of the Incarnation* (1896; 2nd ed. 1902), Orr (*Christian View of God and the World*, 1893), Gore (Bampton Lecture, 1891). See also article JESUS CHRIST.

Incarvillea, a genus of perennial plants belonging to the order Bignoniaceæ. They bear racemes of tubular flowers. *I. sinensis* is a greenhouse plant

with scarlet flowers; *I. Olga* is a hardy plant bearing abundant pink flowers of much beauty.

Ince-in-Makerfield, par. and tn., Lancashire, England, 1 m. S.E. of Wigan; has collieries, iron works, railway-wagon works, and cotton mills. Pop. (1901) 21,270.

Incendiarism. See ARSON.

Incense. The use of incense must have crept into the church at a very early date, since it is condemned by Tertullian. It was not generally adopted till the 6th century, in the time of Gregory the Great. The idea of incense as a symbol of worship was, however, always there. In Rev. 5:8 the 'elders' are seen in the church in paradise with vials, or censers, 'full of incense, which are the prayers of saints.' Frankincense was offered to Christ by the Magi. In the Roman Catholic Church incense is used at high mass, and on many other occasions. In the Anglican Church incense was re-introduced by the ritualists, but the judgment of the two archbishops in the 'Lincoln case,' pronounced in 1890, did not sanction its 'ceremonial' use. Incense consists of a resinous base mixed with odoriferous gums, balsams, etc., well mixed. The material is sprinkled over hot charcoal, becomes volatilized, and the odour is diffused throughout the building.

Incest is carnal intercourse between persons within the Levitical degrees of relationship. In England incest was at one time a capital offence, but the punishment of it was afterwards left to the spiritual courts, and it is not now a crime. In Scotland, although no longer a capital offence, it is still a crime punishable with imprisonment or penal servitude.

Inch, a form of the Gaelic word *innis*, 'an island,' which occurs in the geographical names of Scotland and Ireland, with varied spellings, such as *ennis* (Enniskillen), *inch* (Inchkeith), *inis* (Iniscaltra), *innis* (Innis-kenneth), *inish* (Inishfallen), *insh* (Insh).

Inchbald, MRS. ELIZABETH (1753-1821), English actress, dramatist, and novelist, was born at Stanningfield, Suffolk. In spite of an impediment in her speech, she determined to go on the stage, and in 1772 married Joseph Inchbald, an actor. In 1784 her first play, *The Mogul Tale*, was produced, and eventually her success in this direction led to her giving up acting in 1789. Some of her most successful plays were: *The Midnight Hour* (1787); *Such Things Are* (1788); *The Married Man* (1789); *Every One has his Fault* (1793); *The Wedding Day* (1794); *Wives as they were*, and *Maidens as they are*

(1797); *Lovers' Vows* (1798). She is best remembered, however, by two novels, *A Simple Story* (1791) and *Nature and Art* (1796), whose somewhat exaggerated pathos was much to the taste of readers of her day. She edited *The British Theatre* (25 vols. 1808) and *The Modern Theatre* (10 vols. 1809), two valuable collections of plays, also *A Collection of Farces* (7 vols. 1809). Her *Memoirs* were published posthumously in 1833.

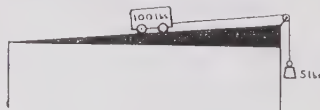
Inchcolm. See BELL ROCK.

Inchcolm ('island of Columba'), a small island in the Firth of Forth, 1½ m. S. by W. of Aberdour (of which parish it is a part), Fifeshire, Scotland. The monastery of Inchcolm was founded by Alexander I. in 1123; the monastic buildings are still in a good state of preservation.

Inchgarvie, a rocky islet in the Firth of Forth, Scotland, part of Inverkeithing par., Fifeshire; it forms the central support of the two great spans of the Forth Bridge. Its old castle (c. 1513), now demolished, frequently served as a state prison.

Inchkeith, isl. in the Firth of Forth, Scotland, 2½ m. S. of Kinghorn, Fifeshire, of which parish it forms a part. The lighthouse, on the highest point, rises to 220 ft. above sea-level. About 700 St. Adamnan founded a monastery on Inchkeith. After the battle of Pinkie the island was fortified by Henry VIII., but was retaken by combined Scottish and French troops in 1549. It is now government property, and is strongly fortified.

Incedon, CHARLES (1763-1826), English tenor ballad-singer, was born at St. Keverne in Cornwall. As a boy he served in the navy, and later added effect to sailor songs by singing in costume. *Heaving the Lead* and *The Arethusa*, two of his most successful pieces, were written for him by Shield. He was almost the first English vocalist to tour (1817) in the United States.



Inclined Plane.

Inclined Plane, one of the so-called simple mechanical powers, depends for its mechanical advantage upon the principle that in moving a body against a force we do work only against the component of the force in the direction of motion. Thus, in drawing a weight of 100 lbs. up an incline of 1 in 20 we overcome a force equal to one-twentieth of the weight—i.e. 5 lbs.

Inclosure Acts. See COMMONS.

In Cœna Domini, a papal bull, named from the day of its issue; contains a statement of ecclesiastical censures against heresies, schisms, sacrilege, infringement upon papal rights, invasions upon church property, injury to ecclesiastics, etc., and denounces various crimes. This bull was proclaimed annually from 1363. After 1773 the periodical publication of the bull was discontinued.

Income Tax is a tax on the net income derived from any source in the United Kingdom, and from sources out of, but paid to residents in, the United Kingdom. Originally a war tax, it was levied in 1797 and repealed in 1816, reimposed in 1842, and annually continued since that date. It has varied from 1s. 4d. in the £1 in 1855 to 2d. in the £1 in 1874, and has produced sums varying from £4,000,000 in 1875 to £25,000,000 in 1900. Though its collection depends on permanent acts, its amount is annually regulated by the Finance Acts. The various branches from which it is derived are divided into schedules. Schedule A taxes the owners of lands and houses, Schedule B the occupiers. It is the duty of the occupier to pay under Schedule A, and, if a tenant, to deduct the money from his landlord's rent. Schedule C taxes income from public funds at home or abroad. In either case it is generally deducted before payment. Schedule D taxes incomes from trades or professions, profits of uncertain value, and from securities abroad. Schedule E taxes official incomes. Incomes under £160 are exempt; incomes under £400 are exempt as regards the first £160; incomes under £500, the first £150; under £600, the first £120; under £700, the first £70. Deductions may be made for life-insurance premiums not exceeding one-sixth of the income. Charities pay no income tax. The year of charge is from April 5, and the tax is payable on January 1 following.

An income tax is in operation in many countries, and the tendency seems to be for others to adopt a similar method of raising revenue. In Italy an income tax was first introduced in 1864; in France it was imposed shortly after the Franco-German war; in Prussia a graduated income tax was introduced in 1891; and since then many other countries, including Holland, Switzerland, Denmark, Austria, and the colonies of New Zealand, Australia, and Cape Colony, have adopted some form of direct taxation of income.

Although certain deductions are allowed on the assessable income

when the gross amount is under £700 in the United Kingdom, the tax is not what is known as a graduated tax. The imposition of a graduated or differential tax is frequently advocated, mainly on the grounds that it would tend to a more equal distribution of wealth, and that the larger the surplus income beyond that required for ordinary needs the greater the ability to pay taxes.

In April 1904 a government committee was appointed to inquire into certain points connected with the income tax, and the inquiry was extended to cover the question whether co-operative societies enjoy undue exemption. With regard to the latter question, the committee reported that there was no evidence of exemption, and that if the profits—i.e. dividends—of such societies were taxed at the source, repayment could be claimed by the individual members. The principal recommendations of the committee were: The more stringent enforcement of the penalties under the existing law, and the amendment of the law to increase the penalties, and make it compulsory to return the schedule even if income is not assessable; that the loss of one year in a business should be deducted from the profit of another year in calculating the average profit; that the relief afforded to the tax-payer in having the average assessment readjusted after a bad year (sec. 133 of the Act of 1842 and sec. 6 of the Act of 1865) should be abolished, the crown not having a corresponding right of readjustment after an exceptionally good year; that profits derived from the working of patents should be taxed at the source—i.e. deducted by the manufacturer or licensee from his payment to the patent owner; that exemption or abatement of tax to residents abroad should be abolished in the case of foreigners, and in the case of British subjects relief should only be granted on the certificate of a British consular official, who must certify that the income from all sources is within the limit. Otherwise, the committee reported generally in favour of the present system of incidence and collection. See Pratt's *Income Tax* (1904) and Buchanan's *The Law relating to the Taxation of Foreign Income* (1905).

Incommensurable, in mathematics, is the term applied to a number which cannot be represented as a definite fraction—i.e. as the ratio of two whole numbers. The square roots of the vast majority of the natural numbers are incommensurables, such as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, $\sqrt{10}$, $\sqrt{40}$, and so on. Cube roots and higher roots of all but a comparatively few

numbers are also incommensurable. The circumference of a circle is incommensurable with respect to the diameter (see CIRCLE), and the diagonal of a square or cube is incommensurable with respect to the side or edge.

Inconvertible Paper Currency. Bank or government notes are said to be inconvertible when the holders are not entitled to claim from the issuers immediate payment of them in gold (or silver). Such currency is attended by many evils, and the notes are almost invariably at a discount.

Incorporated Law Society. This society consists of solicitors, and was founded in 1827. By statute it keeps the roll of solicitors, examines candidates, issues annual certificates, and inquires into cases of misconduct by a disciplinary committee, which is bound to report to the court if it finds a *prima facie* case of misconduct.

Incorporated Society of Authors, THE, is a society founded in 1884, mainly through the exertions of Sir Walter Besant. Its chief objects are to defend the rights of authors and literary property generally, to bring about the amendment of copyright law in the United Kingdom, and to promote international copyright. The society also advises authors on agreements, publishers' estimates and accounts, and similar matters. The recognized organ of the society is the *Author*, published monthly.

Incorporeal Chattels and Hereditaments. Roughly speaking, the distinction between corporeal and incorporeal hereditaments in real property corresponds to the distinction between choses in possession and choses in action in personal property. Incorporeal hereditaments are such as cannot be conveyed by mere physical delivery. They are said to 'lie in grant.' They arise by prescription or grant, and can only be conveyed by deed. They include easements, rent charges, commons, profits à prendre, offices, dignities, etc. They may either be appendant or appurtenant, or in gross. An incorporeal hereditament is held in gross when it has no estate to support it—e.g. an advowson held without any land attached to it.

Increment, UNEARNED, is a term used to denote an increase in the value of land resulting, not from any expenditure of labour or money on the part of the owner, but from independent causes, such as the increase of population in the neighbourhood, and consequently greater demand for land or houses. It is main-

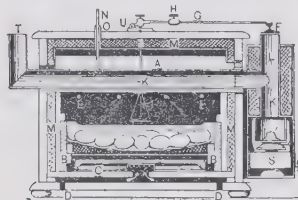
tained by some that this 'unearned' increase in value belongs rightly to the public, and should be appropriated for the community by methods of taxation or raising devised to that end.

Incubation. In birds, the development of the embryo begins before the egg is laid; but for the completion of the process it is necessary that after laying the egg be kept at a constant temperature for a period. This is effected by means of the high body temperature of the parents, who incubate or brood over the eggs within the nest. In not a few instances incubation is carried on by the female alone; in others the cock also assists; while in the megapodes, or mound-builders, the eggs are laid in a heap of rotting vegetation, the temperature of which is sufficiently high to render brooding unnecessary. In the case of the ostrich and of running-birds generally the cock takes at least the major part in incubation, but the eggs are in part left to the action of the sun's rays. In the majority of birds incubation is carried on within a nest, which is often lined by non-conducting material, and thus helps to maintain a steady temperature. A uniform degree of moisture is also a necessity, and breeders, rightly or wrongly, ascribe the high percentage of cripples in artificial hatchings to sounds or vibrations in the vicinity of the incubator which do not appear to affect the embryos in the presence of the parent bird. The period of incubation varies greatly: it is three weeks in the common fowl, four in the duck, six to seven weeks in the ostrich, ten to twelve days in the humming-birds, about fourteen days in the swallow, and so on.

Though in the strict sense incubation is peculiar to birds, the habit of brooding over the eggs or young is far from uncommon in animals. For instance, among invertebrates the centipede *Scolopendra* broods over its eggs, which, it is said, do not hatch if the mother be removed; and the common earwig similarly broods over her eggs and young like a miniature hen.

Incubators, ARTIFICIAL. The art of hatching eggs by artificial means was known to the Chinese at a very early period. From what we can learn of their method, the warmth of decomposing vegetable matter, on the principle of the hotbed and gardener's frame, was the means employed. There are, however, points in successful incubation—such as the regulation of the temperature, the admission of fresh air, and the control of moisture—which render such a system inconvenient and unreliable, and it was reserved for

modern times to develop a system of artificial incubation and rearing that would commend itself to poultry fanciers. The first incubator which combined the essential properties was invented by Mr. Thomas Christy, who employed hot water for his purpose. This was held in a cistern which overlaid and partly surrounded an egg-drawer, the whole being enclosed in a jacketed wooden chest. The operator was able by means of a thermometer to keep the temperature of the egg-drawer at from 100° to 106° F. with great ease. A tap was provided for drawing off the cool water, and about a quart of hot was added by means of a funnel twice in the twenty-four hours, thereby keeping up a uniform temperature. A shallow tray containing water to keep the air moist, and means of ventilation, were also provided. About the year 1880 Mr. Charles Hearson invented a novelty in the form of the thermostatic capsule, by which the heat could be much more perfectly regulated without the intervention of hot water.



Hearson's Incubator.

A, Water tank heated by lamp S through flue K, passing round incubator, with exit at L. B, Drawer with eggs. C, Pan with water to moisten air entering at N, and passing out at E. A, Capsule; F, rod; and G, lever hinged at U, to raise damper V. H, Sliding weight to regulate pressure. M, Packing. N, Tank thermometer. O, Tube for filling tank. Z, Chimney for discharge of products of combustion.

The principle employed was the great variation in the boiling-point of fluids. Without difficulty a fluid was compounded which would boil at 100° F., and being enclosed in an air-tight capsule of elastic metal, it was evident that when 100° F. was reached expansion would at once take place. By placing the lower end of a vertical metal rod in the centre of the upper and flat surface of the capsule, the moment the capsule began to expand the rod would be slightly lifted. The upper end of this vertical rod, which passes through a tube placed above the centre of the capsule, abuts upon and is capable of raising a horizontal lever, which runs out on the right-hand side of the incubator, and there carries a damper suspended on a wire. When the capsule expands, the vertical rod rises and pushes up the lever arm, and thus lifts

the damper and allows the escape of the heat generated by a lamp or gas jet. The heat is further regulated by a sliding weight which moves freely on the horizontal lever. By a judicious regulation of the size of the flame and the adjustment of the weight, a temperature of 103° or 104° F. can be maintained with scarcely any variation during the entire period of incubation. The capsule is normally just sufficiently expanded to keep the damper about one thirty-second part of an inch above the flue immediately over the flame; but if the thermometer sinks a degree the damper falls, and the heat in the drawer immediately begins to rise to such a point as to again raise the damper. Mr. Hearson's capsule has been adopted by many other manufacturers of incubators, but the credit of the invention is undoubtedly his.

Artificial incubation is superior to the natural process in the following respects:—(1.) A much larger percentage of fertile eggs are successfully hatched than if placed under hens. (2.) The chickens are free from vermin. (3.) When reared in a properly made foster-mother, they escape the risk of being trodden to death by their over-anxious parent.

Artificial incubation is largely used by gamekeepers for rearing pheasants, as well as by poultry-keepers. Machines are constructed of various sizes for 30, 50, 100, 200, or more hens' eggs, and they are also adapted for ostrich eggs, and are largely used on ostrich farms in S. Africa. It has been objected that artificial incubators, although successful in hatching eggs, make no provision for bringing up the chicks. This difficulty has, however, been amply provided for by various forms of foster-mothers artificially warmed by lamps, or by a combination of lamps and hot-water apparatus. In these contrivances the chickens thrive fully as well as with hens, as their movements are better controlled in bad weather. In due time the chicks are transferred to cold brooders, and finally to suitable poultry-houses. Young chickens are capable of picking up food as soon as they require nourishment, and one accessory to artificial incubation is the introduction of foods suited to the digestion of newly-hatched chickens. See *Sutcliffe's Incubators and their Management* (1896) and *Incubators and Chicken-rearing Appliances* (1898).

Incumbent is the most general term applied to the holder of an ecclesiastical benefice. By the Title of Incumbents Act, 1868, an incumbent who is not a rector, but who is entitled to celebrate

marriages, etc., and to take all the fees for them, is entitled to be called a vicar.

Indecency. The sale of indecent books and the exhibition of indecent or monstrous objects is a misdemeanour punishable with hard labour. Under the Obscene Publications Act, 1857, such books may be searched for, seized, and destroyed. The performance of any indecent act in a public place is a misdemeanour. Sending indecent matter through the post is punishable, on the prosecution of the postmaster-general, by a fine of £10, or twelve months' imprisonment. By the Indecent Advertisements Act, 1889, the publication or posting of indecent advertisements is punishable summarily with a fine of forty shillings, or with one month's imprisonment. Any act of gross indecency by a male person is an offence under the Criminal Law Amendment Act, 1885. In Scotland, 'lewd, indecent, and libidinous' practices are offences at common law. Obscene publications are punishable under the Burgh Police Act, 1892; and the Criminal Law Amendment Act, 1885, and the Indecent Advertisements Act, 1889, apply to Scotland. See also PROSTITUTE and VAGABOND and VAGRANT.

Indefatigable, a British second-class cruiser (3,600 tons) launched in 1891. Since 1784 there have been naval vessels of this name.

Indemnity. An indemnity is a contract by which one person promises to save another from loss in certain circumstances which are contemplated by the parties. For example, a contract of insurance is a contract of indemnity. If the promisor is unconnected with the transaction except by his promise to pay the loss, the contract is a guarantee, and must be in writing; if he is not unconnected, but is to derive some benefit from it, the contract is one of indemnity.

Indenture, in English law, is the ordinary name of a deed made between two or more parties. Formerly when deeds were executed in duplicate, both parts were written on the same skin, which was then cut with an indented edge, so that if compared in future the parts might tally. This practice was abolished in 1846.

Independence, tn., cap. of Jackson co., Missouri, 8 m. E. of Kansas City. It has flour and woollen mills, and has become a residential suburb of the neighbouring city. It was occupied by Mormons from 1831-8, and there are still 2,000 members of the sect in the neighbourhood. The town was formerly an outfitting centre for emigrants to California. Pop. (1900) 6,974.

Independence Day, the anniversary of the adoption by Congress of the Declaration of American Independence (July 4, 1776). It is observed as a legal holiday throughout the States, and at one time the formal reading of the Declaration was an essential part of the usual celebrations.

Independencia, commonly called FRAY BENTOS, seapt. and cap. of the Rio Negro dep. of Uruguay, and seat of the Liebig factory for the preparation of extract of meat, is situated on the Uruguay R. Pop. 6,000.

Independent Labour Party, THE, inaugurated at Bradford on Jan. 14, 1893. It was established with the object of bringing the trade unions of the country into the political arena as a distinct organization for securing the direct representation of labour in Parliament, without any regard either to Liberalism or Toryism. The leader of the movement was Mr. Keir Hardie. The Labour Representation Committee is an executive body, representative of all classes of workers, and charged specially with matters affecting the choice of parliamentary candidates in the labour interest. The Independent Labour Party has been frankly a socialist organization from its inception. The Bradford resolution defining the object in view now appears as 'An Industrial Commonwealth founded upon the Socialization of Land and Capital,' to be attained by 'the education of the community in the principles of socialism, the industrial and political organization of the workers, and the independent representation of socialist principles on all elective bodies.' The programme, as settled at the twelfth annual conference at Cardiff on April 4 and 5, 1904, consists of the following demands:—(1.) A maximum eight-hours working day, a six-days working week, with the retention of all existing holidays, and Labour Day, May 1, secured by law. (2.) The provision of work to all capable adult applicants at recognized trade union rates, with a statutory minimum of sixpence per hour. (3.) State pensions for every person over fifty years of age, and adequate provision for all widows, orphans, sick, and disabled workers. (4.) Free, secular, moral, primary, secondary, and university education, with free maintenance while at school or university. (5.) The raising of the age of child labour, with a view to its ultimate extinction. (6.) Municipalization and public control of the drink traffic. (7.) Municipalization and public control of all hospitals and infirmaries. (8.) Abolition of indirect taxation, and the gradual trans-

ference of all public burdens on to unearned incomes with a view to their ultimate extinction. The party is also in favour of adult suffrage, with full political rights and privileges for women; the immediate extension of the franchise to women on the same terms as it is granted to men; triennial Parliaments, and the second ballot. There are over two hundred branches of the organization in London and the provinces, and the membership was stated to be 15,000 in 1904. At the general election of 1900 ten seats were contested by Independent Labour Party candidates, but only one was won—Merthyr-Tydfil, by Mr. Keir Hardie.

Independent Order of Odd-fellows. See ODDFELLOWS.

Independents. See CONGRESSIONALISM.

Indeterminate Form, a mathematical expression applied to a fraction which takes the

form $\frac{0}{0}$. It is usually possible, by

consideration of what the value of the fraction becomes, as the numerator and denominator are taken smaller and smaller, to determine the value. Thus the

fraction $\frac{a^m - b^m}{a^n - b^n}$ takes the form $\frac{0}{0}$ when $a = b$. But put $a = b + e$,

where e is a vanishingly small quantity. Then the fraction becomes ultimately

$$\frac{a^m - b^m}{a^n - b^n} = \frac{b^m + mb^{m-1}e + \dots - b^m}{b^n + nb^{n-1}e + \dots - b^n} = \frac{m}{n} b^{m-n},$$

which is accordingly the value of the fraction which appeared at first to be indeterminate.

Index, in mathematics, is a number attached to a quantity to indicate the power to which that quantity is to be raised. Thus, the result of multiplying the quantity a by itself may be written aa or a^2 ; and in the latter form 2 is the index. When the index is a whole number—2, 3, 6, etc.—the operation represented by it can be performed arithmetically in all cases. When, however, the index is a fraction, it may not be possible to effect the complete arithmetical operation indicated. Thus $8^{\frac{1}{3}}$ means the cube root of 8, and that is 2; but the quantity $2^{\frac{1}{2}}$, which means the square root of the cube of 2, cannot be expressed accurately by a whole number, or by a fraction with finite numerator and denominator. If $a^x = b$, then x is called the logarithm of b to base a . See LOGARITHMS.

Index, CEPHALIC. See ANTHROPOLOGY.

Index Librorum Prohibitorum, vel Expurgandorum, a list of books officially prohibited by the Roman Church. The earliest example is the prohibition of the heretical writings of Arius. Pope Gelasius (492-6) drew up a catalogue of forbidden books. The first full Roman index was issued by Pius IV. in 1557-9. This was confirmed by Clement VIII. (1595). The Prohibitory Index absolutely forbids the entire works of heresiarchs, etc. The Expurgatory deals with the contents of books which are deemed immoral or heretical, and forbids them until the objectionable matter is expunged. All versions of the Bible by unauthorized persons are placed upon the Index, as well as all books which animadvert upon Roman doctrine. Thus the literary freedom of the Roman Catholic is very limited. The case of Mr. St. George Mivart, who was condemned for his articles in English periodicals, is a recent example. Some of the works of Jewell, Usher, Sanderson, Bull, Pearson, Chaucer, Spenser, Addison, Goldsmith, and Macaulay are in the Index. Later indexes are those published in Rome (1819), Dublin (1837), and Mechlin (1843).

Indexing. For the first fifty years after the invention of printing, tables of contents are much more often found than alphabetized indexes; but these become fairly common in the 16th century, though it was not till a century later that the word 'index' in England superseded the older 'table.' In 1878 Mr. H. B. Wheatley's *What is an Index?* drew attention to the importance of good indexing; and an Index Society was formed (1877), whose publications (1879-91) embrace indexes of various kinds, some of them being rather of the nature of bibliographies and iconographies than indexes proper. Indexing is now taught in connection with some civil service examinations, and also as an occupation. Some simple rules were laid down by the Index Society as to the treatment of proper names and alphabetical arrangement. The simplest method of procedure is to write each entry on a separate slip of paper (which must not be too small), and then arrange, edit, and number these slips for the printer. Poole's *Index to Periodical Literature* (1882-1903), indexes in the Royal Society's *Catalogue of Scientific Papers* (1867-1902), Palmer's *Index to the Times* (quarterly), and the Harleian Society's *Indexes to Wills, Parish Registers, and Heraldic Visitations* are all good instances of the development of indexes in recent times.

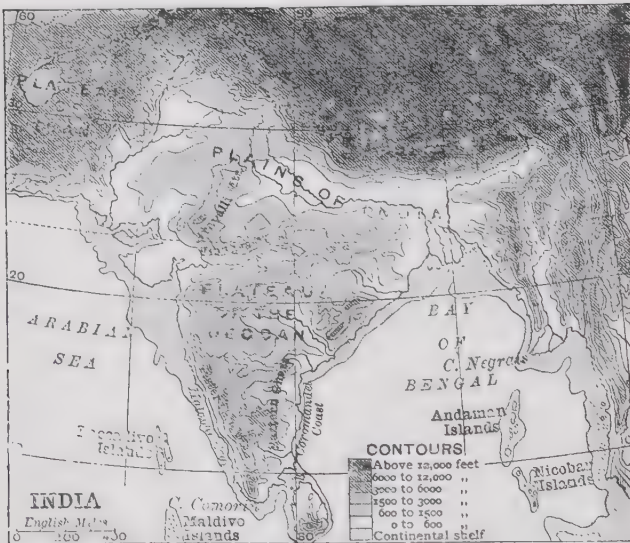
India. Geography.—Within the last decade of the 19th century international arrangement was busily engaged in demarcating and defining the external frontiers of India—e.g. conventions with Russia (March 11, 1895) in respect of the Pamirs, with France (Jan. 15, 1896) as to Siam, with Afghanistan (Nov. 12, 1893, and Dec. 19, 1895) regarding the Afghan border, with Persia (Dec. 28, 1895) relative to the Baluch frontiers, with China (March 1, 1894, and Feb. 4, 1897), and with Siam at various dates from 1868 to 1894. In this article India is used to denote that connected block of territories over which the king of the United Kingdom of Great Britain and Ireland exercises either territorial dominion or suzerainty as emperor of India, a title pro-

most limit is in lat. 37° N. on the Taghdumbash Pamir; its southernmost points are Cape Comorin, lat. $8^{\circ} 4'$ N., and, on the opposite side of the Bay of Bengal, Victoria Point, in the Mergui district of Tenasserim, about lat. 10° N. The area is not yet entirely surveyed, but is estimated at 1,835,000 sq. m. (The census returns give 1,766,597 sq. m., but this excluded Nepal and some other unsurveyed tracts.) The population in 1901 was 294,361,056, or about one-fifth of mankind.

Physical Divisions.—These comprise the border-land on the N.W. frontier, the main Indian peninsula with its three subdivisions of the alluvial plains of Upper India, the Dekhan (Deccan) plateau, and the maritime districts, and, finally, the province of Bur-

Tochi. Then comes the highland of Waziristan; while the Gumal R. marks in general terms the divide between the democratic tribes of Pushthu-speaking Pathans, the Baluchis of Persian and the Brahuis of Dravidian origin, who render obedience to their khans or headmen. A new mountain range of tilted strata of recent formation, in which the stately deodar is replaced by juniper, commences s. of the Gumal, and takes its name from its main peak, the Takht-i-Suliman, 11,800 ft. in height. Its parallel serrated ridges of limestone are then pushed back by the sandy desert of Gandava, and, threaded by the Bolan Pass, are curved from their southerly course until they are piled up into a knot of mountains about Quetta. Thence one range goes off to the N. in the Khojak, while another, called the Hala Mts., runs down to the coast at Karachi.

The Peninsula.—The plains of the Indus and Gangetic systems owe alike their prosperity and their desolation to the rivers Indus, Jumna, Ganges, and Brahmaputra. On the N. the Himalayas ('abode of snow') rise to a mean elevation of 18,000 ft. in successive ranges, occupying a breadth of some 200 m., and sweeping in a continuous curve of 1,500 m. from Kashmir to Assam. Beneath them lies a deep trough of rank vegetation, known as the Tarai; while the Sivaliks, the graveyard of countless mammals, raised by more recent disturbances, form a foot-rest to them from Hardwar to the banks of the Beas, and enclose the Duns (or valleys), of which Dehra Dun forms the largest bay of territory. Below the mountain barrier stretch the alluvial plains, till on one side they reach the Arabian Sea, which washes the coasts of Kutch, and the Bay of Bengal on the other. On the w. an uplifted arm of metamorphic rocks, known as the Aravalis, divides Rajputana, and their débris has helped to form the Vindhya Mts., whose secondary sandstone formations are continued almost up to the Ganges below Benares. The Vindhyas form the divide between Hindustan and the Dekhan, and in the past this barrier diverted the course of Aryan advance to the E. of Bengal. A little above Atock the Indus receives on the w. the southern drainage of the Hindu-Kush from the Kabul R., and on the E. collects the waters of the five rivers Jhelum, Chenab, Ravi, Beas, and Sutlej, which give to the Punjab ('five rivers') its name. Thence the Indus flows in ever-changing channels to Sind. The Jumna, rising in Garhwal, once fell into the Arabian Sea; but it now carries eastwards the drainage of the Aravali Mts. into the



claimed at Delhi in 1877. The qualification implied in 'connected' is added to exclude Aden and Perim, which are legally an integral part of the Presidency of Bombay. On the other hand, the French and Portuguese settlements which lie within the continent of India will be treated of in separate articles. To the Portuguese belong Goa, Damão, and Diu, on the w. coast, representing an area of 1,638 sq. m.; while Pondichery, Karikal, Mahé, and Chandanagar, French territories, cover little more than 196 sq. m.

External Frontiers.—India stretches from Gwattar (Gwatar) Bay, in the Gulf of Oman, or (to choose its most westerly point) from the mountain Koh Malik-i-Siah, s. of Seistan, near long. 61° E., to the Mekong R., in long. 101° E. of Greenwich. Its northern-

ma, dealt with in a separate article.

The North-Western Borderland.—The crumpling and folding of the rocks in late Tertiary times have given to India on the N.W. its magnificent frontier of mountain ranges, through the softer beds of which the rivers have cut a path to the Indus, and formed the passes by which friend and foe have poured into India. From Wakhan, through Yasin, Chitral, and Swat, the Shandur range is but an offshoot of the Hindu-Kush system, which even extends its long arm to the Safed Koh range, enclosing the Kabul R. and the Khaibar (Khyber) Pass. In turn the Safed Koh throws off southern spurs, the Samana and the Shutar Gardan, whose rugged limestone ridges let through the waters of the Kuram and the

Ganges at Allahabad. The Ganges does not, like the Indus, rise on the farther slopes of the Himalayas, but on the seaward face of the higher ranges, bursting at Hardwar through the mountain wall of the Sivalik Hills, and finally uniting with the Brahmaputra to form the vast delta of 80 m. along the Bay of Bengal. The alluvial plains created and maintained by this great river-system extend over the provinces of Punjab and Sind, the main part of the United Provinces of Agra and Oudh, Bengal, and Lower Assam.

The second division of the Indian continent is the great tableland of the Dekhan. The Vindhayas on the N. are succeeded, beyond the intervening Narbada valley, by the Satpura range, S. of which the Tapi follows the westerly direction taken by the Narbada and enters the Arabian Sea near Surat. Beyond the Tapi valley commence the W. Ghats, pursuing the general line of sea-coast at about a distance of 40 m., until they meet the Nilgiris. The W. Ghats were the divide when, in the Mesozoic era, the Indian peninsula was continued across the ocean to Madagascar, and so on till it joined the mainland of S. Africa. At the present day the rivers which have their sources in them—the Godavari, with a course of 800 m.; the Kistna, with one of 800 m.; the Kaveri (Cauvery), and others—run eastwards, and make their way through the so-called E. Ghats into the Bay of Bengal. These Ghats, of less altitude and more broken than those on the w., begin in the Mahanadi valley near Katak, and stretch, at a distance of some 60 m. from the coast, south-westwards for 500 m., till they end in a deep fissure under the shadow of the Nilgiris. Basins of the Gondwana system—a great sandstone formation in which coal is very generally present—lie in the north-eastern quarter of the plateau, or in the valley of the Godavari. The provinces of British India situated in the Dekhan are Bombay on the w., the Central Provinces and Berar in the N., Madras on the E. and S., and on the S.W. the highland districts of Coorg perched on the W. Ghats. The chief native states are Hyderabad and Mysore, with numerous Maratha states under Bombay and the Central India Agency. The configuration of the country and the influence of the Ghats render most of the Dekhan subject to frequent droughts.

The maritime division includes on the E. the alluvial and Cretaceous seaboard districts of Madras and a fringe of Bengal, with the deltas formed by the Godavari and the Mahanadi, and on the w. the

rich steamy Konkan districts of Bombay. At the extreme S., the Madras districts below the Nilgiris are divided by the Palni and the Cardamom ranges of high elevation, which are continued across the straits into Ceylon. Travancore and Cochin are the chief native states in this portion of the continent.

The table below exhibits the names, area, and population of the provinces classed as British India. In October 1905 the province of Bengal was divided, and the new province of Eastern Bengal and Assam was formed. This partition aroused intense feeling among the natives (exclusive of the Mohammedans, who approved

Provinces.	Area in sq. m.	Population.	Government.
Madras	141,726	38,209,436	Gov. in Council.
Bombay, with Aden.	123,064	18,559,561	" "
* Bengal	151,185	74,744,866	Lieut.-Governor.
United Provinces of Agra and Oudh }	107,164	47,691,782	" "
Punjab	97,209	20,330,339	" "
N.-W. Frontier	16,406	2,125,480	Chief Comm.
Burma, with Shan States, etc. }	236,738	10,490,624	Lieut.-Governor.
Central Provinces ..	86,459	9,876,646	Chief Comm.
† Assam	56,243	6,126,343	" "
Berar	17,710	2,754,016	" "
Coorg	1,582	180,607	" "
Ajmir	2,711	476,912	" "
British Baluchistan ..	45,804	308,246	" "
Andamans and Ni- cobars	3,188	24,649	" "
Fourteen Provinces .	1,087,249	231,899,507	

* Divided in October 1905, and a new province formed, Eastern Bengal and Assam, under a lieutenant-governor.
† Manipur is included in the Census.

British India.—The census and other official returns divide British India into 14 provinces, but Berar, which belongs to Hyderabad, finds a place there only because its administration vests in the British government. In 1901 the Punjab

of it). Mass meetings passed resolutions against the separation, and a boycott of British goods was attempted. The agitation was, however, fruitless.

Civil Administration.—The unit of British administration in



was divided, part of it across the Indus being constituted into the North-West Frontier Province.

India is the district, of which there are 258, exclusive of the capital of the empire, Calcutta.

The officer responsible for a district is called collector, or, in the non-regulation provinces, deputy commissioner. He is also its chief magistrate, and exercises more or less control in all other departments, except the judi-

group of districts goes to form a division, of which a commissioner is the head. To him the provincial government looks for supervision of the collectors, and advice on all matters of legislation or public administration. The

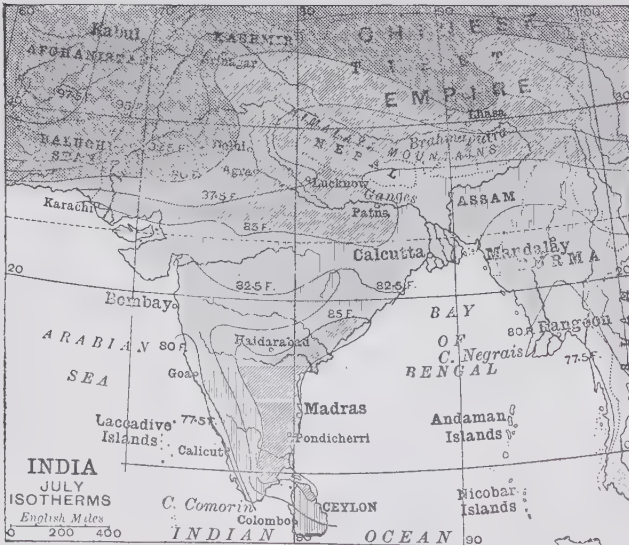
separate from the executive, and is conducted according to the civil and criminal codes by subordinate judges, district judges, and high courts. The supreme authority in India, to which all provincial governments are subordinate, is the governor-general of India in council. The government of India consists of the viceroy and six members of council, exclusive of the commander-in-chief, who divide between them the work of the several departments (except the foreign department, under the care of the governor-general himself), entrusted to seven secretaries; but all matters of importance are decided by the whole executive, styled the governor-general in council. For the purpose of making laws, the executive council is enlarged by additional members. Above the government of India, and responsible to Parliament, is the British Secretary of State for India, who is assisted by the Council of India, consisting of twelve members, whose concurrence is requisite for certain purposes, such as making grants of the revenues of India, borrowing money, and certain other matters laid down by statute.

British Provinces.—Nowhere is education more widely diffused than in Madras, or the administration beset with fewer difficulties. The leading cities are Madras, Trichinopoly, and Madurai; but Calicut and Salem have populations exceeding 70,000. Coffee, cardamom, and cinchona are the chief products of the well-wooded and picturesque tract of Coorg, which is often described as the Indian Switzerland.

The Bombay Presidency consists of three well-marked divisions—the maritime strip of the Konkan below the Ghats, continued beyond Surat by the alluvial districts of Gujarat; the plateau of the Dekhan, stretching to the Central Provinces; and the plains of Sind, which depend for their crops wholly on the annual rise of the flood of the Indus. The Dekhan districts, and at rare intervals Gujarat, are liable to drought. Bombay, the capital, is the second city of India in population (776,006); and Poona (the former capital of the Marathas), Ahmadabad (the capital of Gujarat), Surat, and Karachi (the capital of Sind) are large centres of commerce and population.

The Central Provinces are in part liable to drought, but rich in forests and in tracts that yield full harvests of corn and cotton in favourable seasons. Nagpur is the headquarters of the chief commissioner, and Jabalpur is the only other considerable city of the provinces. The capital of Berar is Akola.

North of Sind is the Punjab,



cial. In most of the larger towns municipal committees are entrusted with self-governing functions. Districts are parcelled into subdivisions called Mamlat or Tahsils, of which assistants to the collector have charge. In every province except Madras a

head of the province is a governor aided by two councillors, as in Madras and Bombay; or a lieutenant-governor alone, as in Bengal, the United Provinces, the Punjab, and Burma; or a chief commissioner elsewhere. The judicial administration is, as a rule,

with its capital at Lahore. The chief feature of the province are the tracts between the rivers (Doabs), in which irrigation affords the means of raising rich wheat crops.

The United Provinces, with their capitals at Allahabad and Lucknow, constitute the most important province in the empire. They are inhabited by a strong and thrifty population. In the Agra Province the land revenue is settled either with the village *zamindars* or with the village headman; but in Oudh nearly three-fifths of the villages belong to large proprietors, or *talukdars*. The land is generally fertile, and well irrigated by canals, of which the Ganges, Jumna, Agra, and Betwa are the chief. The number of large cities in these provinces exceeds that of any other province in India.

The chief city of Bengal is Calcutta (with suburbs), the most populous city in India, with 1,106,738 souls. Across the river is Howrah, with 157,594; while Patna, despite the terrible ravages of plague, is not much behind it in numbers, the total being 134,785. Altogether there are sixteen large cities in Bengal, and no less than fourteen of its districts have a population exceeding 2 millions, one of them, Maimansing, counting 3,917,460 inhabitants in an area of 6,332 sq. m. The permanent settlement is generally in force throughout the province, and the rainfall rarely fails except in the division of Orissa.

Assam, with its capital, Shillong, has three divisions, of which two are in the valleys of the Brahmaputra and the Surma, and one in the hill districts. Tea is extensively cultivated, one-fifth of the population are aboriginals, and there is no large city in the province.

Burma has already been described. Ajmir and Merwara form two small districts, with headquarters at Ajmir, a city containing a population of 73,839. British Baluchistan, with headquarters at Quetta, has a population of about 308,000. The Andaman and Nicobar Islands, of which Port Blair is the headquarters, are a penal settlement, with a population of 24,650 souls.

The Native States.—The native states number between six and seven hundred principalities of different sizes, enjoying various degrees of independence in their internal affairs, but having one feature in common—that the king's writ does not run in them, and the courts of British India exercise no jurisdiction over any of their inhabitants, unless they are British subjects or British servants. Their territories are, in fact, foreign territory; and if

their chiefs are unfit, from age or other cause, to administer them, the requisite authority and jurisdiction over their subjects are exercised for them by the suzerain power, courts of foreign jurisdiction being established not by the law of British India, but by the will of the British government. At the same time, every native state, the largest as well as the smallest, enjoys only a limited independence. The British government has a right to regulate the strength and equipment of their military forces. For its own army, the government of India may demand cantonments, right of passage, and supplies in the protected states. It requires, for the same reason, full jurisdiction over the systems of railway communication. Again, no native state has any foreign or external relations. The protecting power acts for them in all international and interstatal affairs. Even in the exercise of their internal administration, the British government interferes on all occasions to prevent dismemberment, to suppress rebellions, to check gross misrule, and to stop inhuman practices, slavery, or religious persecution. In the case of the smaller states, its intervention goes still further, relieving them of a part of their criminal or civil jurisdiction, providing courts of appeal and even courts of original jurisdiction, graduated according to the capacity of the petty chiefs. In every native state disputed successions are settled by the British government. British policy thus maintains rule over an area of more than a million sq. m., and a population estimated at 72 millions. The Hyderabad and Kashmir states are each of them nearly as large as Italy, on the mainland; while Gwalior is as large as, and Mysore larger than, Greece. Other states are of a smaller size, and some of them not bigger than Monaco. Many of them are clustered together in a large block or agency, such as Rajputana, Central India, and Kathiawar.

The Population.—Of the whole population, whether in British India or in the native states, about 70 per cent. either till the land or are engaged in operations directly connected with agriculture. The rural character of the Indian populations weakens their powers of co-operation or interest in self-government, it renders them tenacious of local customs and traditions, it narrows their trade and commerce, and aggravates the distress caused by failure of rains or canals. If the rainfall is insufficient for agricultural operations, rural society is paralyzed. The cultivation of tea, the extension of cotton

mills, and the development of the mineral resources of India partially relieve the tension; while schemes of irrigation have reclaimed the deserts of Sind, the Punjab, and parts of Rajputana, and even in the Dekhan have saved the people from much suffering. The parts of India most liable to insufficient rainfall include the w. and s. parts of the United Provinces, and the Punjab E. of the Sutlej; the w. and N. states of Rajputana, and of the central plateau bordering on the United Provinces; the Dekhan districts of Bombay above the W. Ghats, and those of Madras above the E. Ghats; the Mysore plateau, and the s. and w. region of Hyderabad; with the districts of Madras along the E. coast, and at the extremity of the peninsula. There is no evidence to show that the system of land tenures has any material influence upon liability to famines. The alluvial plain of Bengal enjoys generally a heavy rainfall (48 to 66 inches), and its permanent settlement does not strengthen its power of resistance on the rare occasions that this is deficient. Moreover, in the United Provinces, the permanent settlement in the Benares division, and west of it the system of assessing cultivators or village communities according to a proportion of the rental value of their holdings, exist side by side. The conclusion at which the famine commissioners arrived in 1880 has been confirmed by subsequent years—*viz.* that all Indian famines are to be directly traced to the occurrence of seasons of unusual drought, and that British India invariably grows sufficient food supplies for its population. The prevention of famines, therefore, resolves itself into measures for increasing cultivation by irrigation; while the mitigation of famine depends upon the means of communication, with the timely provision of labour and wages for those who can work, and gratuitous relief for those who cannot. The principal crops are rice and millet, but very large quantities of wheat and other food grains and of sugar, tea, cotton, oil seeds, opium, jute, indigo, and tobacco, are cultivated. In 1904 coal was mined to the value of £1,300,000, and the gold output was valued at £2,300,000. Salt and iron ore are mined, and there are extensive oil fields. Projects are now under consideration for the extensive development of the mineral resources of the peninsula.

Irrigation.—Unfortunately, there are limits, financial and physical, to the extent to which irrigation can be carried out. Out of thirty-four large works classed as productive, thirteen managed

to yield only 0.71 per cent. in 1898-9 as interest on capital outlay. Of those classed as protective, upon which the outlay comes from a special annual provision known as the Famine Insurance Fund, several pay next to nothing; and this is especially true of those situated in the Dekhan and parts of India most constantly exposed to famine. The Tungabudra project, or the Karnul Cuddapah Canal, with a capital account of nearly one million and a half sterling, yielded a net revenue in 1898-9 of £2,960. Evaporation, reduction of inflow, and exposure to the excessive heat of rainless seasons, take heavy toll of the supply; and while these are the effects of the dry season, those of the normal seasons of rainfall are hardly more remun-

water. Early in 1905 further extensive irrigation schemes and new canals were sanctioned which will irrigate nearly 2 million acres.

Occupations other than Agricultural.—Of such occupations, those connected with the provision of food and drink enlist the largest section of the population, over 16½ millions being thus engaged. Textile fabrics and articles of dress employ about 11½ millions, while service of various kinds accounts for over 10 millions. Administration by the state or by local bodies claims between 5 and 6 millions; nearly 5 millions have adopted learned or artistic professions; commerce occupies more than 4 millions; the provision of wood, cane, and matting, of light, firing, and forage, of leather, hide, and horns, of glass,

lay of 227 millions sterling has been expended, are open to traffic, and give a return of 5.5 per cent. Railways are under the direct control of the supreme government; but the country is also traversed by good metalled roads in every direction. Some of them are maintained by the provincial governments, while others are constructed and kept up at the cost of district or urban boards.

Languages.—Though nearly a hundred and fifty languages, derived from nearly twenty linguistic families, are spoken in India, three of those families—the Aryo-Indian, the Dravidian, and the Tibeto-Burman—represent the speech of 97 per cent. of the inhabitants. To the first of these belong Hindi, Bengali, Marathi, Punjabi, Gujarati, Uriya, Urdu, and Sindhi, spoken by over 221 millions of people. Hindi is found chiefly in the United Provinces, Bengal, the Central Provinces, and the Punjab; Bengali in Bengal, Assam, the United Provinces, and Burma; Marathi in Bombay, Haidarabad, the Central Provinces, Madras, and Mysore; Punjabi in the Punjab and Sind; Uriya in Bengal, Assam, Madras, and the Central Provinces; Urdu in the United Provinces, Haidarabad, Bombay, Madras, Mysore, the Central Provinces, and Baroda; Sindhi in Sind, Bombay, the Punjab, and Baluchistan. Of the Dravidian group, the principal representatives are Tamil, Telugu, Canarese, and Malayalam, spoken chiefly in Madras, Mysore, Haidarabad, Berar, Coorg, and Bombay by 56½ millions. In the third group, the Tibeto-Burman, Burmese is spoken by some 9½ millions, chiefly in Burma and the Shan States; other branches, such as Kachari, Garo, Tipperah, Naga, Mikir, Lushai, in Assam and Bengal, represent but a small fraction of the total population. The same may be said of the Kolarian languages spoken by aboriginal tribes, the Santhals, Bhils, Gonds, Kols, Mundas, Korwars, etc.

Religions.—Two principal religions—Hindu and Mohammedan—account for about 92 per cent. of the population. Of these, the former claims more than 207 millions; the latter, about 62½ millions. Of the Hindus, more than half are found in Bengal, the United Provinces, and Madras, while Bombay, Rajputana, and Haidarabad contain nearly 38 millions more. The Mohammedans, equally ubiquitous, have about 60 per cent. of their total in Bengal and the Punjab. The Buddhists number some 9½ millions, about 98 per cent. of them being in Burma. Next in order come the aboriginals with about 8½ millions, their habitat being principally in Bengal, the Cen-



nerative, for the cultivators naturally refuse to take the taxed water when nature bestows upon them a sufficiency of rain. Of the total debt of India—212 millions sterling—23 millions represent capital invested in productive works. In schemes called major works, the British government owns 33,824 miles of canals or tanks, which irrigate 10 millions of acres. Its annual expenditure on their maintenance is £882,000. The two Ganges canals, with their distributories, measure 8,959 miles, and the Sirhind canal 5,181. Besides major works, there are numerous minor works constructed out of ordinary revenues. Many of them are extremely profitable, and, taking all classes of irrigation works together, nearly 20 millions of acres in India were in 1902-3 supplied with

pottery, and stoneware, of metals and precious stones, gives work to some 14 millions; over a million are in the service of the native states; about 400,000 are employed in defence, military and naval; and more than 5 millions have means of livelihood independent of work. The tea and coffee industry in Assam and Coorg, where an abundant monsoon is experienced, gives work to nearly a million labourers. In factories inspected by government some 430,000 persons find daily employment; and in the coal and gold mines there is an annually increasing opening for labour.

Communications.—Communications are hardly less important than irrigation to an agricultural population, especially in India. About 27,000 miles of railway, on which a capital out-

tral Provinces, Assam, and Central India, and their forms of faith multitudinous. Of Christians there are nearly 3 millions; of Sikhs, 2 millions; of Jains, 1½ millions. Rather more than 94,000 Parsis represent the fire-worshippers of Persia, and of these nearly 84 per cent. are in Bombay. Jews, mainly to be found in the same province, are less than 20,000 in number.

Commerce.—In 1904-5 the exports and imports of India amounted to nearly 179 millions of pounds sterling, made up of merchandise £34,452,000 and gold and silver £22,018,000 imported, and merchandise £105,000,000 and gold and silver £5,218,000 exported.

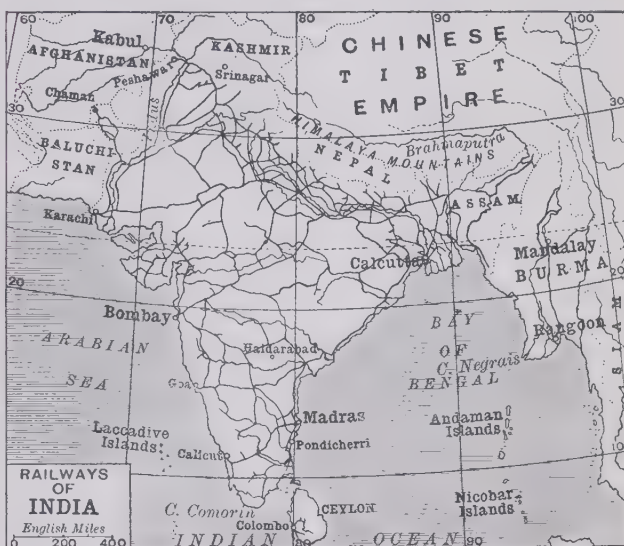
Finance.—The most important sources of public revenue are the land, opium, and salt taxes, and the receipts from excise and customs duties, and stamps, while the chief headings of expenditure are the army, civil service, and public works. In 1903-4 the revenue reached £30,150,000, and the expenditure £79,230,000. The surplus for 1904-5 is estimated at £3,485,000.

Education.—The masses of the Indian populations are illiterate. Less than six persons out of every hundred have ever learnt or are learning to read and write. Such as it is, education is distributed very unevenly among sexes, classes, and localities. According to the latest quinquennial review, there were some 4,529,000 children at school, or about one-fifth of those who were of school-going age. But while the percentage of male children was 23.1, that of female was only 2.6. Burma, where, by the Buddhist religion, a reasonable liberty is accorded to women, came first with a percentage of 22.3; in Bombay it stood at 16.6; while Madras and Bengal could not show more than 15.4 and 15.2 respectively. The Punjab, the United and the Central Provinces, yielded very poor returns. Bombay owes its high position to the Parsis and the Brahmans, who attach the highest value to education. The most illiterate of all are the aborigines, found chiefly in the Central Provinces. Mohammedans, especially in the N., prefer the religious instruction given in their mosques to the more practical secular teaching of public schools; but the efforts of the late Sir Sayid Ahmad, who founded the college at Aligarh, are beginning to effect a change of disposition in this matter. As to locality, the most barren spots in the field of education are the native states, except those in Madras and Bombay. Small as is the number of Indian boys under instruction, the pro-

portion of those learning English is still lower, being only one child in seventy-nine of school-going age. There are five universities—at Calcutta, Madras, Bombay, Punjab, and Allahabad—with a total of nearly 9,000 students. These have numerous affiliated colleges, in which a higher education is given than at the schools. Normal schools for the training of teachers have been established in every province. There are also medical colleges, engineering and other technical schools, and a few art schools.

Bibliography.—Sir T. Holdich's *Indian Border-land* (1901); R. D. Oldham's *Geology of India* (1893), and the numerous works cited in his *Bibliography of Indian Geology* (1888); Sir C. Ilbert's *Government of India* (1898); the *Sta-*

Jaxartes across the steppes and passes into the valleys of the Kabul and the Gomal. Of these, the Dravidians, who had passed through Makran to the south of India, remained for many centuries undisturbed by the Aryans. But though, later on, their Chera, Chola, and Pandya dynasties come into notice, we know nothing of their early history save that their language, Tamil, was perfected before the Sanskrit, and that they were strong enough to hold their own in speech and institutions. On the other hand, against the Dasyus—a generic name for various aboriginal tribes—the Aryans waged a continual war of subjection; and those of them who were not absorbed into the Sudra caste may still be found maintaining a separate and difficult existence



tistical Atlas of India; Reports of Famine Commission; annual Moral and Material Progress Reports, and the Quinquennial Reports of the Local Governments; on education, the Report of the Indian Education Commission, 1883, and the three Quinquennial Reviews.

History.—Our sketch will divide itself into four periods—the Aryan, the Buddhist, the Mohammedan, and the British.

The Aryan Period.—From Menu, who wrote about B.C. 900, we learn that 'the space between the Himavat and Vindhya to the eastern and western seas the wise know as Aryavarta.' There were at least two non-Aryan races which inhabited India before the Aryan immigration flowed from the valleys of the Oxus and the

among the hills and forests of India. Such are the Santhals, the Bhils, Kols, etc. From the Punjab the Aryans were pressed forward by succeeding streams of immigration and by the natural growth of their own population till they occupied Bengal and Orissa on the E., and Gujarat and Malwa on the W. They next come into conflict with the Andra dynasty; and, having crossed the Vindhya, they encountered the Dravidians, who had meanwhile been progressing northwards. At the date of the Rig Veda (B.C. 1400) the Aryans were a pastoral people, enjoying life without the trammels of caste. The Atharvan Veda depicts them as having deteriorated; and in the Code of Manu (900 B.C.) we find the four-fold division of castes—Brah-

mans, or priests; Kshatriyas, fighting men; Vaisyas, the general body of citizens; and Sudras, the servile classes—fully established. Their epic poems, the *Mahābhārata* and Valmiki's *Rāmāyana*, are so laden with myth as to yield no historical facts; and we must be content to place the Puranas, with their lists of solar and lunar kings, in the category of legends.

Buddhist Period.—From B.C. 259, when the Mauryan king Asoka was crowned at Pataliputra (near Patna), we begin to fit together a skeleton of history from relics in stone, earth, or clay, and from tablets, inscriptions, and coins collected and arranged by European research. Literary remains, few and widely scattered, are mainly contributed by Greek and Chinese writers. Alexander's expedition to the Hyphasis (Beas), B.C. 326, sheds light merely upon the history of the Punjab. In B.C. 302, Seleukos Nikator, whom Alexander left at Babylon, sent Megasthenes on a mission to Pataliputra; and Fa-hian in A.D. 399, and Hiuen Tsang (629-645), went over the same ground, and extended their tours to other parts of India. Asoka's pillars and rock inscriptions (B.C. 253-251), found near Peshawar, in Junagarh, Katak, Ganjam, Rajputana, Delhi, Allahabad, and, in 1895, on the Nepalese frontier, indicate the far reach of his rule. His edicts prohibit the sacrifice of animals; order medical relief for man and beast; enjoin the planting of trees and sinking of wells; dwell with satisfaction on the peace and prosperity which prevail; and preach the virtues of liberality, piety, and religious toleration. They excite our interest in the state of India, but leave it unsatisfied. Architectural remains supply lists of dynasties, and nothing more. The navy's shovel disinters coins which tell the tragedy of vanished empire, but give no details of its rise and fall; and we catch mere glimpses of Indo-Bactrians, White Huns, and Scythians. Even in the small tract of country which came under the observation of Megasthenes, we hear of one hundred and seventeen principalities besides the Prasii, and it is evident that no dynasty had rule over any extensive portion of India. The Mauryan rulers at Magadha claim our main interest. From about 300 B.C. to the 5th century A.D. they maintained their authority and their language, Pali. They were succeeded by the Andras. But other dynasties—the Valabhis of Gujarat, the Rajput Chauras, the Chalukyas of Badami, and the kings of Kanauj—crowd upon the canvas, and assert claims to a pre-eminence which no historic facts can

prove or refute. Recent researches forbid any reliance upon the Samvat era of Vikramaditya, counted from B.C. 56, or the Shake era (A.D. 78) of the Indo-Scythian king Kamiska (Kanishka), hitherto recognized as standpoints of early Indian chronology. Real history, in fact, remains a blank until the lurid light of Mahmud's destructive expeditions falls upon its pages.

Mohammedan Period.—We are now upon firmer ground, and from A.D. 1001 onwards there is abundance of material for history. Kings, as Nasir-ud-din, Baber, Humayun, wrote memoirs; foreign visitors, as Ibn Batuta, Sir T. Roe, Bernier, Tavernier, were entertained; and literary men, as Ferishta, Kufi Khan, Abul Fazl, were patronized and assisted. Between 1001 and the conquest of Delhi by Baber (1527) four kings claim special attention—Mahmud, Shabab-ud-din, Ala-ud-din, and Mohammed Tughlak. Mahmud's grandfather, a Turki slave, founded the dynasty of Ghazni, A.D. 961, and was succeeded by his son Sabuktegin. The neighbourhood of the Ghaznevites was resented by Tejpal, rajah of Lahore, but with disaster to himself; and when Sabuktegin found it necessary to chastise him for breach of treaty, the Hindu states who joined forces against the invader brought down upon themselves the loss of the trans-Indus districts. On the death of Sabuktegin, Mahmud led a succession of expeditions against the Indian principalities, conquering (1008) Kanauj, Delhi, Ajmir, Gwalior, Ujjain, and carrying the spoils of Somnath to Ghazni (1024). In the reign of Behram (1118), the men of Ghor overthrew the Ghaznevites; and in 1176, the Ghorian Shabab-ud-din, though he failed to subdue the Rajputs, brought under his sway Gujarat, Gwalior, Bengal, and the whole of Hindustan except Malwa. On his death (1206) Hindustan became detached from Afghanistan, and upon this unhappy country the stress and storm of the Moguls fell. Kutb-ud-din, whom Shabab-ud-din had left in command of his Indian forces, became king of Delhi, and founded the line of slave kings who ruled from 1206 till 1288. Of these, Altamash added Malwa to the Delhi kingdom (1226). The Turki house of Khilji (1288-1321) held the Mogul invaders in check; and the most famous of that line, Ala-ud-din (1295-1316), extended his sway down even to Madras. Thus the succeeding Tughlak dynasty (1321-99) held rule over a larger kingdom than had ever come under one crown, until the mad freaks of Mohammed Tughlak broke it into pieces. His projects of foreign conquest in the

direction of China and Persia ended disastrously, impoverishing his treasury, and letting loose upon his defenceless subjects a host of unpaid soldiery. Taxes were collected with fire and sword; the inhabitants of Delhi were forcibly driven out to people Daulatabad, at a distance of 600 miles; Bengal and the Dekhan (Deccan) revolted; and a vivid description of the desolation and disorder which prevailed is given by Ibn Batuta. An important consequence of this misrule was the establishment in the Dekhan of the kingdom of the Bahmini sultans of Kulbargah (1347), which broke up into the five principalities of Ahmadnagar, Bijapur, Bidar, Berar, and Golconda. The same causes also assisted the growth of the Hindu kingdom of Vijayanagar, founded about 1335 by two brothers of the Kuraba caste, which fell at Talikota (1535) under the combined attack of the five principalities mentioned above. Malwa and Khandesh revolted, and the capture of Delhi by Tamerlane (1398) completed the disruption, and left Hindustan a prey to anarchy and famine. So matters remained until Baber acquired Kabul in 1504, and invaded the Punjab, claiming it as part of the heritage of Tamerlane. In 1524 he gained a victory at Lahore, and two years later he defeated Ibrahim Lodi near Panipat, and occupied Delhi and Agra, ruthlessly putting to the sword all who dared to oppose him. Step by step he won back the revolted provinces of Gwalior, Mewar, Chanderi, and Bengal, but died at Agra (1530), in the midst of family quarrels and intrigues. His son and successor, Humayun, commenced a disastrous reign by resigning Kabul and the Punjab to his brother Camran. He then invaded Gujarat, and had just taken Champaner when tidings of the rebellion of Shir Khan in Behar reached him. Returning to deal with this outbreak, he suffered a signal defeat at Kanauj (1540), and eventually fled to Amirkot (Umarkot). Later on he took refuge in Persia, then ruled by Shah Tamasp, leaving Shir Khan to establish himself and his descendants of the Sur line on the throne of Delhi. Shortly afterwards, with the help of a Persian force, he captured Kabul and Kandahar, and, invading the Punjab, had by 1555 recovered Lahore, Delhi, and Agra, when he met with an accident, and died before his general, Bairam Khan, had finally crushed the resistance of Sikandar Sur.

Akbar was only thirteen years of age when his father died, in 1556; but with the help of Bairam Khan he rapidly established his authority over Ajmir, Gwalior,

and Lucknow. Able pilot, however, as Bairam proved himself amid these early shoals, his arrogant use of power disgusted Akbar, who presently dropped him, and in 1560 took full command of the vessel of state. Rebellions in Hindustan were suppressed with the utmost vigour; while, partly by force of arms and partly by diplomatic matrimonial alliances, the Rajput chiefs, with the exception of Udaipur, were brought into friendly relations. Upon the subjection of Gujarat, Bengal, Kashmir, and Sind, which quickly followed, Akbar was able to give his personal attention to the Dekhan, where the courage and diplomacy of Chand Bibi had foiled the endeavours of his generals. The sultana was murdered by a faction, and the emperor, having reduced the fort of Ahmadnagar and subdued Khandesh, returned to his capital, Delhi. His remaining years were clouded by the refractory conduct of his son Selim, and by the murder of Abul Fazl, author of the *Ayen Akbari*. He died in 1605, having established an Indian empire not merely on the foundations of military force, but upon sound principles of civil administration. His spirit of religious toleration and his patronage of Sanskrit literature won the Hindus to his side, while his abolition of the *jezia*, or capitation tax on infidels, removed an irritation which was not merely one of taxation. His revenue system conferred upon the masses of the cultivators the benefit of a correct measurement of their lands, with a fixed proportion, one-third of the produce, payable to the state in money. The author of this reform was Todar Mul. The army was reformed, the forts of Agra and Allahabad erected, and many useful public works executed.

Selim succeeded his father under the name of Jehangir, and reaped the fruits of his own unfilial conduct in the rebellion of his son Khursu, and later on in serious disagreements with another son, Shah Jehan. He showed vigour in carrying on the war with Mewar, but was less successful in the Dekhan, where the Abyssinian, Malik Amber, had founded a new capital at Aurangabad, and had strengthened his position with the *rayats* by introducing a reformed revenue system.

Shah Jehan, the next emperor, was deposed by his son after a reign of thirty years. By his prudent administration he enriched India with various public works, among them being the splendid buildings of Delhi, with its peacock throne valued at £6,500,000, and the mausoleum at Agra to

his queen, now so widely known as the Taj Mahal.

The long reign (1658-1707) of his successor, the bigoted and suspicious Aurangzib, was in every direction disastrous to the kingdom of Delhi. His treatment of his brothers showed how little mercy his enemies might expect. Dara was put to death in 1659, Shuja was driven an exile into Arakan, and Murad publicly executed after the farce of a trial. By his treatment of the widow and children of Rajah Jaswant Sing of Jodhpur he disgusted the Rajput princes, and in the military operations which ensued they and their people suffered cruelties which they never forgot. The Hindu subjects of the empire were excluded from office, insulted by the reimposition of the *jezia*, and aggrieved by interference with their social and religious customs. In the Dekhan, Sivaji, at first nothing more than a leader of banditti, was founding a power which would presently measure swords with the emperors. In 1670 the Marathas offered the imperial provinces their choice between payment of *chowth*—one-fourth of the revenue—or plunder at the hands of their armies. Aurangzib's cruel treatment of Sivaji's successor, and his conquest of Bijapur and Golconda—Mohammedan states that might have resisted the Marathas—left the field open for the latter. The emperor died at Ahmednagar in 1707, leaving behind him universal discontent and desolation, and an empire crumbling to its fall. His son and successor, Bahadur Shah, drove the Sikhs out of Sirhind, and took their leader, Bandu, prisoner. Farokshir, who followed, inflicted further losses upon the Sikhs, many of whom he tortured with inhuman cruelty. On his deposition in 1719, insurrections ensued in all parts of the empire; and during the reign of Mohammed Shah, Asaf Jah established himself in the Dekhan as an independent power. The Marathas rapidly consolidated their strength under the Peshwas, and Mogul rule was but a phrase when Nadir Shah seized the throne of Persia, and in 1738 invaded India. Delhi was taken, and, after a general massacre, its treasures were carried off by the destroyer. Recovery from such a blow was impossible, and before the death of Mohammed Shah in 1748, Ahmed Shah Durani had seized the Punjab, and was organizing those incursions which, while hastening the imperial downfall, inflicted upon the Marathas the crushing defeat of Panipat in 1761. Alamgir II. witnessed a repetition of the horrors of Nadir Shah's descent, and with his assassination in 1759 the Mogul empire virtually

passed away. From Shah Alam the East India Company, after the victory of Buxar, obtained the diwani of Bengal in 1765; and in 1771, weary of life at Allahabad under British protection, he made his way to Delhi, emperor in name, Sindia's prisoner in reality. In 1778 his eyes were put out by a Rohilla chief; and though again restored by the British to the imperial dignity, he died in 1806 without any real power or authority outside the palace. Delhi, with the surrounding country, was ruled in the name of his successor, Akbar Shah, until 1832, when it was annexed. After the mutiny in 1857, Bahadur Shah II., convicted of assuming the sovereignty of India, of murdering Christians, and of abetting revolt, was deported to Rangoon, where he died in 1862.

British Period.—On Dec. 31, 1600, the London East India Company obtained a charter for the exclusive privilege of trading to all parts of Asia, Africa, and America beyond the Cape of Good Hope, eastward of the Straits of Magellan. In 1613 they established a factory at Surat under a *firmán* granted by the emperor, that port being then the chief outlet from which the *hajj* was made to Mecca; and other positions were occupied at Calicut and Masulipatam. In 1668 Bombay was made over by the Portuguese as part of the dowry of Catherine of Braganza, and in 1687 the headquarters of the British traders were transferred thither from Surat. In 1689 permission was given by Aurangzib's officers for the purchase of the site of Calcutta, and in 1715 Bengal became a separate presidency. The year 1698 was a turning-point in the history of the London company. The state wanted a loan of two millions, and, as an inducement, the subscribers were allowed to convert their shares into a joint stock under the name of the English East India Company. William III. granted a charter, and the celebrated court of directors and general court of proprietors were then constituted. In 1708 the London company and the English company combined under the title of the United East India Company. Extensions of its charter were from time to time obtained, and when, in 1765, Shah Alam added the diwani, progress was rapid. The battle of Plassey in 1757 had ensured military supremacy. The company now took over the financial control, leaving the judicial administration with the nawab. But the misery and disorganization which the occurrence of famine brought to light compelled them, in 1772, to exchange commerce for territorial

sovereignty. The Regulating Act of 1773 provided the machinery of government needed for this revolution; and under it Warren Hastings, the first governor-general of Fort William in Bengal, took his seat in council on Oct. 20, 1774. Pitt's Act of 1784 established the control of the board of commissioners for the affairs of India. In 1813 trade was thrown open to licensed persons, and 'the undoubted sovereignty of the crown' over the territories acquired in India was reserved; possession of those territories was, by a special act, guaranteed for a term of twenty years. The Charter Act of 1833, which sanctioned possession for a further period of twenty years, recognized the imperial character of the company's rule by appointing Lord William Bentinck, then governor-general of Bengal, to be governor-general of India. On the suppression of the mutiny of 1857, the powers and territories of the company were transferred to the crown by the Government of India Act of 1858, and at the same time the Secretary of State's Council was created. In 1860 the separate European army of India was abolished, and in 1877 the style of Empress of India was added to the older titles of Queen Victoria.

The process by which the company's rule was built up must now be explained. The first great forward movement was taken in Madras, where Fort St. George, founded in 1629, had in 1653 risen to the dignity of a presidency. In 1672 the French purchased Pondicherry. Its proximity to Madras quickly brought the French and English companies into collision. Thus it came about that, in 1746, Admiral Labourdonnais, and Dupleix, the governor of the French possessions in India, seized upon Madras, which was not restored until the peace of Aix-la-Chapelle in 1748. Hostilities soon broke out again. The occasion was a quarrel between native powers as to the succession to the vicereignty of the Dekhan on the death of Asaf Jah in 1748, the two claimants being Muzaffar Jung, the elder son, whom his father had nominated for his successor, and Nazir Jung, the younger son. The dispute involved also the nawabi of the Carnatic, for which Chanda Sahib and Mohammed Ali were rivals. Both sides invoked European aid; and while the French espoused the cause of Muzaffar Jung and Chanda Sahib, the English lent their support to the other claimants. As the result of a long series of operations, the French were completely worsted, Chanda Sahib perished, and Mohammed Ali was left

master of the Carnatic. It was during these operations that the name of Clive was first heard, and his brilliant defence of Arcot (1751) gave promise of the great things he was to accomplish later on. In 1756 came the Seven Years' war with France, and a fresh conflict between the rival companies. At the outset the French general, Lally, obtained some striking successes; but his siege of Fort St. George had to be raised, the Northern Circars were conquered by Forde, and in January 1760 Lally's army was defeated by Eyre Coote at Wandiwash. The victory of the English was decisive, and in 1761 Pondicherry surrendered. Lally, taken prisoner, was sent to England, and when allowed to return to France, met with the same ingratitude that had awaited the disappointed Dupleix. Shortly after these events the English were threatened from a new quarter. Haidar Ali, who commanded a force sent by the Hindu ruler of Mysore to take part in the siege of Trichinopoly, deposed his sovereign, and proceeded to make large conquests in the Carnatic. Against him the English agreed to aid the nizâm; but Haidar contrived to break up the alliance, and in 1769 threatened Madras. His attack was only averted by mutual restitutions. At the outbreak of war between France and England in 1778, the French were expelled from Pondicherry and Mahé. The latter place being in Mysore territory, Haidar found an excuse for attacking the English, who failed to obtain any signal advantages over him. He died in 1782, but his son Tipu continued the conflict until his defeat and death at Seringapatam in 1799. Hindu rule was now re-established in Mysore, while the outcome to the English was the acquisition of Canara, Coimbatore, Salem, and part of two other districts by the Madras government. Other districts were awarded to the nizâm, two of which, Bellary and Cuddapah, later on were, by exchange, incorporated in the presidency. The long-continued hostilities exhausted the company, and it was found necessary to claim from the nawab his share of the expenses, as well as repayment of loans made to him. At length, all other arrangements having failed, the Carnatic was annexed, and the titular dignity of nawab alone remained to the grandson of Mohammed Ali. Finally, the family were pensioned, and the title of Prince of Arcot conferred upon its representative. By these means the presidency of Madras was built up, and the states which had assisted the company,

Travancore and Cochin, were brought into the British protectorate.

While the events just narrated were occurring in the south, the company's factory in Calcutta was extending its possessions, and at a critical moment Madras was able to send Clive to the relief of the sister presidency. The peril came from Suraj-ud-Daula, governor of Bengal, who in 1756 descended upon Calcutta, and thrust the British residents into what was afterwards called the 'Black Hole,' where a hundred and twenty-three of them perished in a single night. On Jan. 2, 1757, Clive relieved the town, and on June 23 won the victory of Plassey. Meer Jafir was installed in the place of Suraj-ud-Daula, and from his successor, Meer Kasim, the company obtained Burdwan, Midnapur, and Chittagong. In 1764 Shuja-ud-Daula, wazeer (vizier) of Oudh, aided by the emperor Shah Alam, threatened Patna; but the British, under Major Munro, defeated him in a decisive battle at Buxar. This victory laid Oudh at the feet of the company, and enabled Clive, on his return to India in the following year, to secure from the emperor the diwani, or fiscal administration, of Bengal, Behar, and Orissa, with the jurisdiction of the Northern Circars. In 1772 Warren Hastings was placed at the head of the British administration, and in the following year he lent the wazeer of Oudh the help of British troops to crush the Rohillas, who, in the reign of Mohammed Shah, had established themselves in Rohilkhand. The quarrel arose out of the failure of the Rohillas to pay to the wazeer the sum stipulated for his aid against the invading Marathas; and, backed by the English, the wazeer triumphed. Faizulla Khan, the Rohilla leader, was, however, recognized as chief of Rampur under a British guarantee; and when, in 1801, the wazeer ceded Rohilkhand to the company, Rampur was continued in possession of the Afghan family. After the Rohilla war, Hastings plundered Chait Sing of Benares, and extorted a heavy fine from the Begum of Oudh, for which and other acts he was impeached before Parliament in 1788. The company was now brought into close relations with Oudh, which they hoped to make a buffer state between their Bengal possessions and the territories beyond, so constantly swept by the Marathas. The wazeer, however, was a weak ruler, and his successors were equally unable to maintain order or to defend Oudh. These duties, therefore,

devolved upon the company, and the cessions of territory, with contributions of money demanded from time to time, were not excessive for the protection afforded. In 1819 the wazeer was made king, but in 1856 it was found imperative to assume administration of the country, and Wajid Ali was pensioned.

The policy of setting up buffer states having failed, it now became necessary to bring the Marathas to order; and Lord Lake, having in 1803 inflicted defeat upon them, entered Delhi and took the king under his protection. Considerable tracts of land to the west of the Jumna were annexed, but, as already related, the Delhi districts were, until 1832, administered in the Mogul name. By 1808 British authority had reached the Sutlej; before the end of it the Nepalese were driven out of Sikkim, Kumaon, Garhwal, and Dehra Dun; while to the south, the Sagar and Nerbada territories were wrested from the Marathas. Thus, step by step, the company advanced from Bengal to Oudh, and so north to Rohilkhand, west to the Sutlej, and south to the Nerbada. In other words, they had acquired the provinces now known as Bengal, Assam, the United and the Central Provinces.

While, however, Clive and Warren Hastings were extending the company's rule in the south and east, there was a pause in the west, during which the Marathas first extended their power, and then split up into factions after the battle of Panipat. From 1629 to 1687, when they were moved to Bombay, the headquarters of the company's trade were at Surat. In 1664 Sivaji attacked this city, but was gallantly beaten off. This was the first exchange of blows between the merchants and the Marathas. From a mere collection of Malvali hillmen who joined Sivaji in small, plundering expeditions, the Marathas rapidly grew into an armed nation which spread from one end of India to the other; dared to measure itself against the Durani invader at Panipat; deposed and set up emperors at Delhi; appeared before the 'Maratha ditch' at Calcutta; met the British in arms in the south of Madras, and on the coasts of Bengal; established those dynasties which still rule at Baroda, Indore, and Gwalior, in Central India, at Kolhapur, and in many petty states in Bombay; were represented in the far south at Tanjore by titular kings until 1855; ruled in the Central Provinces until Nagpur was annexed in 1853; and were not ousted from their central dominion in the Dekhan without a severe struggle, in which

their own internal dissensions largely contributed to their downfall. The founder of what is called the Maratha nation was Sivaji, son of a soldier in the service of Bijapur. At an early age he raised small bodies of horsemen, and captured forts in the Dekhan. After gaining victories which induced the emperor to recognize him as rajah, he died in 1680, bequeathing to his followers that spirit of plunder which he had excited. To Sivaji's own successors the legacy was of small value, the real power passing into the hands of the peshwas. Of these, Bajji Rao reduced Malwa, overran Bundelkhand and Hindustan, and exacted from Delhi the cession of *chauth* over the whole empire. With him the British governor of Bombay entered into a commercial treaty; and on the succession of his son, Balaji Rao, a further alliance was made in 1755 for the suppression of piracies, and for the exclusion of the Dutch from trade within the Maratha dominions. Balaji Rao was succeeded by Madho Rao Ballal, who died in 1772, at a time when Sindhia, having recovered from the disaster of Panipat, was resuming operations in Rohilkhand and at Delhi. Raghuba seized upon the peshwaship, and applied to the British for help against his rivals, supported by Sindhia and Holkar. From these dissensions the British gained Bassein, Salsette, and other islands on the Bombay coast. Meanwhile, the alliance with Raghuba was dissolved under the orders of the supreme government, only to be renewed in 1778 by another treaty as the head of the Maratha state. Raghuba was promised the assistance of a British force; but the troops were defeated, and compelled to sign the ignominious convention of Wargaoon (1779). The convention was disavowed at headquarters, and hostilities were renewed. But the English detached Sindhia, and under his guarantee peace was restored by the treaty of Salbai in 1782. Then ensued the Mysore wars, into which the Marathas were partially drawn. Fortunately, however, the great chiefs could not agree among themselves, and in 1801 they were at each other's throats in a fierce struggle for supremacy. In 1802 Sindhia came to the aid of the peshwa, Bajji Rao; but the combined forces were defeated with great slaughter by Holkar, who then advanced upon Poona. At the end of the year Bajji Rao accepted from the British the treaty of Bassein, which brought the court at Poona into subsidiary relations with the company. Holkar retired to the Punjab, while Sindhia formed a league with Berar to defeat the treaty.

But the British victories at As-saye, Gawalghar, Laswari, and Delhi reduced Gwalior, Indore, and Berar to subordinate allies. By treaties with Sindhia in 1803, and with Holkar in 1805, large accessions of territory in Central India accrued to the company, the peshwa, and the nizam. In 1815 disputes between the peshwa and Baroda compelled the Bombay government to interfere, and to force on him the treaty of Poona (1817). When, a few months later, the Pindari war broke out, the peshwa suddenly attacked the British residency, but by the battle of Kirki was reduced to such straits as to be glad to retire to Bithur on a pension granted by the company. There he died in 1851, bequeathing his property and his hatred of the English to his adopted son, the infamous Nana Sahib. With the fall of the peshwa the Marathas ceased to be a nation, and the Bombay presidency at once attained almost its present size, though Sind was not added till 1843. Several native states, Baroda, the Kathiawar chiefships, and numerous other small principalities in Gujarat and the Dekhan, were preserved under British protection. Satara was annexed in 1848, on failure of heirs to the house of Sivaji; but Kolhapur, representing the younger branch, remains a native sovereignty under the protection of the British crown.

The events which added Burma and restored the Punjab to the Indian empire must now be traced. Mention has already been made of the Sikhs, a sect founded in the 16th century by Baba Nanak, welded in the next century by Guru Govind into a military organization, and enrolled in the ranks of martyrs by the Mohammedan kings of Delhi. The withdrawal of Ahmed Shah from India left Ranjit Sing free to extend his authority over the separate principalities north of the Sutlej; and the British company, hoping to see the Punjab formed into a strong and friendly buffer state, gladly recognized his sovereignty in 1809. On his death in 1839 anarchy ensued, and the uncontrolled Sikh army committed aggressions upon British territories which led to the first Sikh war, and the British victories of Mudki, Ferozshah, Aliwal, and Sobraon in 1845-6. The country between the Sutlej and the Beas was then annexed, and shortly afterwards a council of regency was formed to govern the Punjab in the name of Dhulip Sing. In 1848 two British officers were murdered at Multan, and the Khalsa army again broke out. The indecisive battle of Chilianwala in 1849 was followed by the

victory of Gujarat, and the whole province was then annexed to British India.

The events which led to the annexation of Burma were more gradual. Not long after the cession of Chittagong to the company in 1760, the Burmese invaded Arakan, and, after their conquest of it, complained of the action of Arakanese rebels who found refuge in Chittagong. No redress being given, they violated British territory; whereupon Lord Amherst declared war, and Rangoon was taken in 1824. On the conclusion of peace, in 1826, Arakan and Tenasserim were annexed, and a resident was appointed to the court of Ava. In 1852, Lord Dalhousie being governor-general, reparation was demanded for injuries inflicted upon British subjects; and, on its refusal, Rangoon was again taken, this time to be retained. No sooner was peace restored than the old difficulties recurred; and matters finally reached a crisis when, in 1885, the high-handed treatment of the Bombay Burma Trading Corporation compelled Lord Dufferin to send a force across the border. The forts at Ava were captured, and Mandalay occupied (Jan. 1, 1886). Upper Burma was declared to be a part of the British dominions, and in 1897 Upper and Lower Burma were formed into one province under a lieutenant-governor.

A brief notice of the governor-generals of Bengal, and their successors the governor-generals of India, must conclude this article. Between Warren Hastings in 1774 and Lord William Bentinck in 1828, we have eleven occupants of the former post. The name of Lord Cornwallis is famous for the introduction of the Permanent Settlement in Bengal—a measure of doubtful expediency—for administrative reforms, and for his steady endeavour to resist the increase of territorial acquisition. Lord Wellesley held, on the contrary, that the assumption of imperial responsibilities could alone secure peace and order. After the fall of Seringapatam he without hesitation annexed part of Tipu's dominions. Between 1798 and 1805 he added to the company's rule the Carnatic, several districts round Allahabad, parts of Bundelkhand, Katak, and Balasore, Ahmednagar, the Delhi territory, and the Doab between the Ganges and the Jumna. On his retirement the company felt the commercial strain of his great achievements, and sent out Lord Cornwallis (1805) a second time to preserve peace at any price. His death within three months of his arrival devolved upon Sir John Barlow the uninteresting rôle of doing nothing, while Lord

Minto's term of office (1807-13) was mainly occupied in opening relations with Afghanistan and Persia. After this period of rest, the Marquis of Hastings took up the task which Lord Wellesley had left unfinished, and within ten years completed the political settlement of India. As the result of two wars with the Nepalese, he added Kumaon, Dehra Dun, and Simla to British rule, and with the termination of the Maratha struggle Bombay was consolidated in its present shape; while, the Pindaris being crushed, the blessing of settled order rested upon the whole of Western and Central India. The discredited policy of leaving the native states alone was exchanged for one of isolating them from foreign intrigue and admitting them into a British protectorate. Lord Amherst (1823-8) extended this protectorate across the Bay of Bengal into Burma, and added Singapore, Malacca, Assam, Arakan, and Tenasserim to the company's possessions. In 1828 Lord William Bentinck succeeded as governor-general of Bengal, and in 1834 became the first governor-general of India. He devoted his term of office to internal affairs, abolishing suttee, suppressing the Thugs, and reforming the public services. In the short interval before his successor (Lord Auckland) arrived, Lord Metcalfe in 1835 gave India the liberty of the press. Lord Auckland's rule (1836-42) was memorable for the disastrous Afghan war, when the army left Kabul after an occupation of two years, and a single survivor (Dr. Brydon) reached Jalalabad in 1842. In 1839 Aden was taken and annexed to Bombay. Lord Ellenborough (1842-4) annexed Sind, and avenged the disaster at Kabul by a recapture of that city. Before his recall he also crushed the mutinous troops of Gwalior in the battles of Maharajpur and Panniar, thus removing a source of danger from the path of his successor, Lord Hardinge (1844-48), who carried to a successful close the first Sikh war. Lord Dalhousie held office from 1848 to 1856. By his conquests of the Punjab in 1849, and of Pegu in 1852, and by his annexation of dependent native states, he consolidated British dominion. Oudh also was taken over, owing to misgovernment. He introduced railways and telegraphs, placed Bengal under a local governor, and established legislative councils and a system of public education. After his retirement the mutiny broke out in 1857, which his successor, Lord Canning, was called upon to stem. To him was due the grant of sanads of adoption, by which the native states were

assured against annexation, and admitted into the higher position of subordinate allies of the British government. Ten viceroys have ruled India since Lord Canning left in 1862. Lord Elgin, appointed 1862, died in 1864, and upon Lord Lawrence, who had done so much to save British India in the mutiny, devolved the task of correcting defects in the military system and of restoring the finances. Railways and irrigation were pushed forward as far as funds allowed, and the question of tenant right in Oudh and the Punjab was dealt with. Famine in Orissa, and operations against Bhutan for an insult offered to a British envoy, engaged much of his attention. Lord Mayo succeeded in 1869, and received in durbar at Umballa (Ambala) the Ameer Shere Ali. He introduced into India the system of provincial contracts, under which the provinces were granted fixed allowances, and a large measure of decentralization and local responsibility. On his assassination by a convict in the Andamans (1872), Lord Northbrook became viceroy. Considerable reforms in the financial system marked his rule, and he successfully grappled with a serious famine in Behar. Lord Lytton (1876-80) carried through the Afghan wars, caused by the reception of a Russian embassy at Kabul, and by the murder of the British envoy, Sir Louis Cavagnari. But his most important campaign was that against the famine in 1876-8, which led to the reports of the famine commission, and to the adoption of protective measures against future visitations. Lord Ripon (1880-4) extended the system of self-government, and more fully developed the scheme of financial decentralization originated by Lord Mayo. Lord Dufferin, who took office in 1884, added Upper Burma to the empire, received the Ameer Abdur Rahman of Afghanistan in durbar at Umballa, and encouraged the native states, while reducing their overgrown military forces, to organize a few regiments for imperial service. The main task which devolved upon Lord Lansdowne (1888-94) was the settlement of the currency question, which had proved a chronic difficulty for more than twenty years. By closing the mints, and afterwards making gold a legal tender, he ensured a stability of exchange which has been of great value to the trade and to the treasury. His successor, Lord Elgin, carried through this reform; while the delimitation of the British frontier, which, in arrangement with the Ameer, Lord Dufferin had initiated, was completed. Lord Curzon, appointed in 1899,



was confronted with severe famine and a terrible visitation of plague. He placed the frontier districts and tribal country beyond the Indus under an agent directly responsible to the viceroy, and altered the name of the North-Western Provinces into that of the United Provinces. The coronation of King Edward VII. was celebrated at Delhi in January 1903. Since that date the only events which need special mention are the successful expedition to Tibet in 1904; the pacification of the tribes in the north-west, due largely to the formation of a new north-west frontier province (1904); and the division of Bengal and formation of the new province of Eastern Bengal and Assam (1905), already referred to. In 1905 an acrimonious controversy arose between Lord Kitchener, the commander-in-chief of the Indian army, and the viceroy, Lord Curzon, over the question of the right of the military member of the viceroy's council to criticise the commander-in-chief's proposals before they reached the viceroy. Lord Kitchener's views were upheld by Mr. Brodrick, Secretary for India, with the result that Lord Curzon resigned (August 1905), and the Earl of Minto was appointed the new viceroy. The publication of the correspondence created a very unpleasant sensation. In November 1905 the Prince and Princess of Wales arrived in India for an extended official tour throughout the country and Burma.

There is no single standard work giving a complete history of India. Under the general head of India may be mentioned James Mill's *History of British India*, by H. H. Wilson (new ed. 1858); Sir W. W. Hunter's books on the *History of India* (new ed. 1893 and 1900-2); C. Mabel Duff's *Chronology of India* (1899); and R. W. Frazer's *Literary History of India* (1898). Aryan India: Max Müller's *Sacred Books of the East* (1879, etc.); Abbé Dubois's *Hindu Manners, Customs, and Ceremonies* (trans. 1897); H. T. Colebrooke's *Digest of Hindu Law* (new ed. 1874), *Religion of the Hindus* (1882), and other works; Dr. J. Muir's *Oriental Studies*; M. A. Sherring's *Hindu Tribes and Castes* (1872-81); J. W. McCrindle's *Ancient India* (1901); R. Chunder Dutt's *Ancient India* (1893); and *Asiatic Researches and Journal*. Buddhist India: E. Burnouf's *Introduction à l'Histoire du Bouddhisme Indien* (2nd ed. 1876); *Pilgrimage of Fāhian*, from the French edition of the *Foe Kone Ki*, and S. Seal's *Fah-hian* (1869); Hon. Mountstuart Elphinstone's *History of India* (1866); J. Briggs's *History of the Rise of the Moham-*

medan Power in India till 1612 (1829), from Ferishta; R. Orme's *Indostan* (1782); *Ayeen Akbari* (or 'Institutes of Akbar'), by F. Gladwin (1777); and F. Bernier's *History of the Revolution of the Empire of the Great Mogul* (1671); R. Sewall's *A Forgotten Empire* (1900); Aitchison's *Collection of Treaties in India* (1893); Kaye's *Sepoy War* (1864-76), continued by G. B. Malleson; Grant Duff's *History of the Mahrattas* (1826); Tod's *Rajasthan* (1823); J. Malcolm's *Central India* (1823); M. Wilks's *History of Mysore* (1818); Arbuthnot's *Memoir of Sir T. Munro* (1889); T. Rice Holmes's *History of the Indian Mutiny* (3rd ed. 1888); Malleson's *History of the French in India* (new ed. 1893); H. H. Risley's *Tribes and Castes of Bengal* (1891); W. Crooke's *Tribes of the North-West Provinces and Oudh* (4 vols. 1896); T. Holdich's *Indian Border-land* (1901). The *Lives of John and Henry Lawrence*, Clive, and the various governor-generals of India may be mentioned. For the native states of India, Malleson's *Native States* (1875), W. Lee Warner's *Protected Princes of India* (1894), and Curtis's *Modern India* (1905).

FRENCH INDIA. — In 1664 a powerful company, securing the monopoly of Eastern trade, sent to India one François Caron, who established agencies at Surat and Masulipatam, and ousted the Portuguese from St. Thomé on the Coromandel coast. A few years later Pondichery was purchased by the French company from the Rajah of Vijayapur. For the rivalry with the British, see INDIA (*History*), above. To-day the total area of the French possessions in India proper is less than 200 sq. m., and a pop. of 273,000. They comprise Chandarnagar (near Calcutta), and Karikal, Mahé, Yanam, and Pondichery in the Madras Presidency, and are administered by the governor of Pondichery. The exports are mainly oil seeds and blue cotton cloth, for the weaving of which there are factories at Pondichery.

PORTUGUESE INDIA.—After an adventurous voyage of ten months, Vasco da Gama, the Portuguese navigator, arrived in May 1498 in the harbour of Calicut in India. The profits of this expedition were so great that, in 1502, Vasco da Gama again cast anchor in Calicut, and established settlements and factories along the coast of India from the Hugli to Kathiawar. The sultan of Egypt, jealous of the power which had diverted traffic from his dominions, joined the Arabs in an attempt to destroy the interlopers. A temporary triumph off Chaul

was followed by a defeat which cost the allies 196 out of 200 vessels, and established the supremacy of Portugal in Eastern waters. In 1510 Goa was captured, and became one of the wealthiest and most powerful of Eastern cities. In 1580 Portugal was absorbed by Spain, and the defeat of the Spanish Armada in 1588 opened the commerce of the East to Britain and Holland. The Dutch blockaded Goa; Shah Jehan of Delhi seized the Hugli; the Marathas overran Salsette. To-day Diu, Damão, and Goa (area, 1,638 sq. m.; pop., 1900, 531,798) are the sole Portuguese possessions. See DIU and GOA.

INDIA, IMPERIAL ORDER OF THE CROWN OF. See ORDERS.

INDIA, THE MOST EXALTED ORDER OF THE STAR OF. See ORDERS.

INDIA COUNCIL REMITTANCES. See COUNCIL DRAFTS.

INDIANA, one of the central states of U.S.A., with an area of 36,350 sq. m. It was organized as a territory in 1800, and admitted as a state in 1816. The surface is generally level, although the s. part is somewhat cut by stream valleys. The N. part originally contained extensive prairies, while forests covered the s. part. Most of the state is now under cultivation. The Ohio flows along the s. boundary, and much of the state is drained by the Wabash R., which forms a part of its w. boundary. The capital and chief city is Indianapolis. Agriculture is the most important interest of the state. But favoured by abundant supplies of coal and natural gas, Indiana is fast becoming a manufacturing state. Chief industries are slaughtering and meat-packing, flour-milling, brewing and distilling, lumber, iron and steel, glass, and textiles. The mineral resources consist mainly of coal, petroleum, and natural gas. Pop. (1900) 2,516,462, of which the number of foreign born was 142,121, or 5.6 per cent. Negroes numbered 57,505, or 2.3 per cent.

INDIANAPOLIS, the largest city of Indiana, U.S.A., cap. of the state, and co. seat of Marion co. The parks cover 1,250 ac., and include the extensive Riverside, on both sides of the White R. A monument to the soldiers who fell in the wars of the Union is the most noteworthy structure. A university and several colleges belong to its educational equipment. Its chief products are those of slaughtering and meat-packing, foundry and machine shops, and flour mills. Pop. (1900) 169,164, of which the foreign-born numbered 17,122, or 10.1 per cent., and negroes 15,931, or 9.4 per cent.



Indian Architecture.—I.

Buddhist.—1. Sanchi Tope, Bilva: built 500 B.C., restored 260-250 B.C. (From model in the S. Kensington Museum.) 2. One of the gates of Sanchi Tope: 1st century A.D. *Caves and Rock-cut Temples*.—3. Ajunta: 9th to 10th century A.D. 4. Ellora: 9th to 10th century A.D. 5. Buddhist temple, Gwalior. *Jain Temples*.—6. Palitana: 17th to 19th century A.D. 7. Vimala Sah, Mount Abu: 1032 A.D.



Indian Architecture.—II.

Jain Temples:—8. Small temple, Gwalior: date unknown. 9. Tower of Victory, Chittore: 1439 A.D. *Dravidian:*—10. Seringham, Gopura: 17th and 18th centuries. 11. Choultry, Madura: 1623-1645 A.D. 12. Great Temple, Tanjore: early 14th century. *Northern style:*—13. Ghats, Benares. (Photos by Skeen.)

Indian Architecture. The history of Indian architecture commences with the reign of Asoka (B.C. 272-236), who established Buddhism as the state religion of India. The earliest monuments yet discovered are a series of columns erected by him to commemorate the doctrines of Buddha. The sacred buildings of Buddhism may be considered

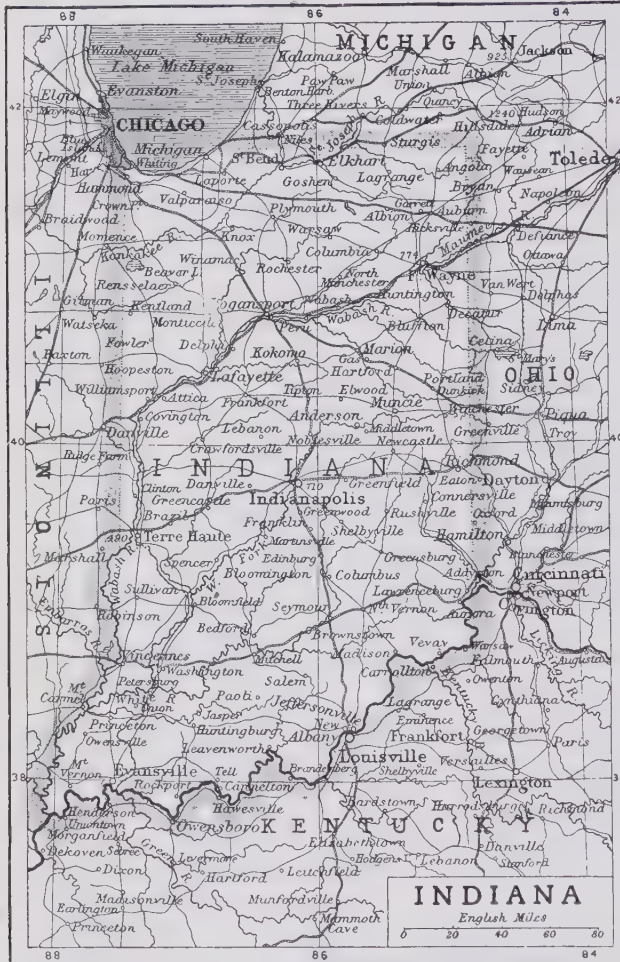
circular wall, and containing in the centre or at the top a small chamber for the preservation of the relics of some saint. Of the temples, or chaityas, only rock-cut examples now exist. These, having only the façade on the face of the rock, show mainly an interior architecture, interesting as being in many points a copy of a wooden building. In

leaving the side aisles and columns in comparative obscurity. The closely set columns hide the boundary walls, and the whole effect is one of great solemnity and grandeur. The cave at Karei, near Bombay, is 126 ft. long by 45 ft. 7 in. broad, and about 45 ft. high, and is one of the finest examples. It was probably built in the first century A.D.

The early Buddhist style was followed by that of the Jains (A.D. 100-1300), which extended over the whole of India from the Himalayas to Cape Comorin, though this style seems to have taken many of its features from some older non-Buddhist style. The Jaina buildings lack the vigour and boldness of the Buddhist, but far surpass them in delicacy of detail.

The normal type of temple consists of a square cell, the *vimana*, lit from the door only, containing a cross-legged figure of one of the twenty-four saints or Tirthankars of the Jaina religion, and surmounted by a pyramidal, spirileike roof, the *stupa*. To this is attached a portico or pillared hall, of varying extent and cruciform in plan. The centre of the portico is roofed by a dome carried on eight columns, with bracket capitals and sloping struts, which form the most characteristic and beautiful features of the style. In the temple of Vimala Sah, on Mount Abu (Rajputana), this portico consists of forty-eight pillars—a very usual number—and both portico and cell are placed in a courtyard surrounded by a double colonnade, which forms a portico to a range of cells, each occupied by a cross-legged image. Externally the temple is perfectly plain, and gives no indication of the magnificence within. Sculptured ornament of great richness and symbolic meaning covers every inch of the building, and even the European critic, accustomed to a more restrained art, must admire the delicacy of the work and the patient industry which has been devoted to it.

Partly contemporaneous with the Jaina is the Hindu or Brahmanical style. It may be divided into three branches—(1) the Northern Hindu, 600 A.D. to the present time; (2) the Chalukyan, or Central Indian, 1000-1300 A.D.; (3) the Dravidian, or Southern Indian, 1350-1750 A.D. All three styles have the small shrine and portico, and the excessive richness of carving and sculpture, of the Jaina style, but show various local differences. Second porches are occasionally added. The northern style has a lofty curved pyramidal spire of very singular and effective outline to the *vimana*, and the porch is without columns, and crowned with a stepped roof in



in two classes—the *topes*, and the *chaityas* or temples. There are also *viharas*, or monasteries, placed near the temples as residences for the priests. They consisted of a courtyard surrounded by cells, and had sometimes a sanctuary for the shrine, but are comparatively unimportant. The *topes* are moundlike erections, rising from a low

plan they consist of a three-aisled, columned hall, having a semicircular apse at the end farthest from the entrance, in which stood the shrine, and a semicircular ribbed roof, closely resembling woodwork. These interiors are lit by one large opening at the entrance, admitting a single volume of light, which falls direct on the shrine at the farther end,

stories. Three doors on the three free sides give access to the porch, the door on the fourth side opening on to the cell or vimana.

The great temple at Orissa (617-657 A.D.) is a fine example. Palaces, tombs, and ghats, or landing places, abound. On the Ganges and other great rivers these ghats, with their long ranges of steps and small shrines, backed by ornamental façades, form important features. In the Chalukyan style the vimana is star-shaped in plan, and is surmounted by a roof, formed either by a straight-sided cone with richly ornamented steps and vase-like finial, or with the curved outline of the northern examples. The windows are filled in with elaborately pierced marble slabs, and the whole temple is placed on a terrace three or four feet in height. The principal monuments are in the province of Mysore. As in the Jaina examples, the normal type of Dravidian temple has a square vimana with a many-storied pyramidal roof. The porch, a square building having a door on each side and a pyramidal roof lower than that over the cell, is placed similarly against the door of the cell. The Hindus seem to have disliked the use of columns in these cells, and never use them except in the largest examples. Cell and porch, forming the temple proper, are enclosed in a rectangular court entered under *gopuras*, or gate pyramids, of great size and magnificence. Within these courts are grouped lakes and tanks for ritual purposes, and the *choultries* or halls of a thousand columns. The choultries were used as halls of ceremony, where the dancing girls attached to the temple danced and sang, and for various ceremonies. They are of extreme richness, often no more than two columns being alike in the one hall.

None of the Indian styles has influenced European work, unless we except the buildings erected by Emmanuel of Portugal (1495-1521) at Tromar and Batalha in Portugal, shortly after the Portuguese settlement in India. Here we find detail of a type utterly unlike that of any other European building, but having many points of resemblance to the rich work of the Jaina style. For Mohammedan architecture in India, see SARACENIC ARCHITECTURE. See the valuable series of government publications edited by Dr. James Burgess in connection with the Archaeological Survey of India.

Indian Army and Defence of India. The Indian army traces its origin to the forces maintained by the East India Company in the middle of the 17th century. Its strength in 1681 did not exceed

700 men. Natives were first enlisted in 1695. On the outbreak of the mutiny in 1857 the native troops outnumbered the European by over 9 to 1—*viz.* 348,000

ice troops, 18,000. Grand total, 291,000. In addition, there is a large and well-organized police force, officered by Europeans, and available for military service.

(2.) Distribution of the Regular Army.

Command.	European.						Native.			
	Regiments Cavalry.	Batteries R.H.A.	Batteries R.F.A.	Batteries Heavy Artillery.	Companies R.G.A.	Batteries Mountain Artillery.	Battalions Infantry.	Regiments Cavalry.	Batteries Artillery.	Companies Sappers and Miners.
Punjab.....	3	4	8	2	3	5	15	15	5	41
Bengal.....	3	3	14	1	3	1	17	11	2	25
Madras.....	2	2	8	1	3	1	8	3	0	33
Bombay.....	1	2	12	0	9	1	11	10	2	32
Total.....	9	11	42	4	23	8	51	39	9	131

and 248 guns to 38,000 and 276 guns. When in 1858 the crown took over India from the East India Company, the Indian army was reorganized. The proportion of native cavalry and infantry to British was fixed at 2 to 1 for Bengal, and 3 to 1 for Madras and Bombay—a ratio still observed at the present day. The artillery, with a few exceptions, was taken out of native hands, and the staff corps was organized for officering the native regiments.

Administration.—The term 'Indian army' includes all the European and native forces garrisoning India, Burma, and Aden, but not the irregular armies of the native states. The entire cost of the army, including European troops, is defrayed by the government of India, and amounts to about 200 millions of rupees annually. The supreme head is the governor-general. By a new Order in Council (1905) the commander-in-chief (India) is charged with the executive command and administration. Since the abolition of the separate armies and commanders-in-chief of the three presidencies in 1895 the country has been divided into four lieutenant-generals' commands, which are further subdivided into ten first-class (major-generals') districts and twenty second-class (brigadier-generals') districts. A staff college for officers of the Indian army was established at Quetta (1904), and is to be transferred to permanent quarters at Deolali in 1906.

Composition. (1.) *Strength.*—Regular army: Europeans, 74,000; natives, 155,000; native reserve, 16,000—total regulars, 239,000. Hyderabad contingent, 8,000. Volunteers, 26,000. Imperial serv-

(3.) *European Troops.*—British regiments go on foreign service for a period of about sixteen years, during most of which time they serve in India, the officers and men being replaced after eight years' service abroad. The strength of units is somewhat greater than at home, and there is one unit peculiar to the country—*viz.* the heavy battery: 5 officers, 100 men, 5 horses, 12 elephants, and 262 bullocks, the two last named for the draught of 5·4-inch howitzers, wagons, etc.

(4.) *Native Regular Troops.*—The native forces consist mostly of Gurkhas, Punjabis, Sikhs, Pathans, and Dogras. The rule adopted after the mutiny of mixing the castes and nationalities in each regiment is no longer entirely followed. When led by European officers whom they know, there is little better fighting material in the world than the Indian army. The term of enlistment is unlimited: a man can claim his discharge after three years, and after twenty-one he is entitled to a pension. The infantry regiments are organized on 'regular' principles. The sepoy is provided with everything on joining, and receives nine rupees a month. Each regiment has 12 European officers (it is under consideration to raise this number), except in the Madras and Bombay commands, where there are only 9, and 17 native officers. The cavalry has been organized on the 'irregular' principle, and the trooper (*sowar*) only receives his carbine and ammunition, providing his own uniform, accoutrements, and, except in Madras, his horse, out of his pay of thirty-three rupees a month, but this is now to be abolished. Each cavalry regiment

has 10 British officers and about 16 native. Since 1886 a limited number of men per battalion, of between five and twelve years' service, have been passed into the active reserve with their own consent. The garrison reserve chiefly consists of men who have been pensioned after twenty-one years' service.

(5.) *Hardarabad Contingent*.—A force of 4 regiments of cavalry, 4 batteries of artillery, and 6 battalions of infantry, kept up by the government of the nizam, which can be removed out of the state in time of war under certain conditions. It was formed in 1800.

Indian Civil Service, THE, is divided into two branches, known as the executive and the judicial departments. The public works, forest, and telegraph departments in India, though sometimes referred to as branches of this service, do not, strictly speaking, belong to it. The highest of the three grades into which the civil service of India generally is divided is sometimes called the 'covenanted civil service,' though it differs in many respects from the old covenanted service. This grade is almost entirely recruited by means of competitive examinations, held in

tion; but in and after 1906 candidates must be over twenty-two and under twenty-four years of age on August 1 of the year in which the examination is held. Successful candidates must pass one year on probation in England before proceeding to India. Within a certain time after reaching India the candidate must decide whether he will serve in the executive or in the judicial branch of the administration. The highest post in the executive branch is that of lieutenant-governor of a province; the highest in the judicial, that of a judge of the high court.



The Indian Ocean, showing Trade Routes.

(6.) *Volunteers* are formed of Europeans and Eurasians: 22,700 infantry, 2,600 light horse, and 1,000 artillery. State railway employes, recruited in India, are obliged to join the railway volunteer corps.

(7.) *Imperial Service Troops*.—Certain portions of the armies of the native states are organized and equipped on a uniform plan by the Indian government, so as to be able to co-operate with the British forces. The expenses are borne by the native states, and the troops are inspected and trained, but not commanded, by Europeans. The system was introduced under Lord Dufferin in 1889, in lieu of the money contribution by the native rulers towards imperial defence.

England, but in special circumstances a certain number of natives of India may be appointed by the Indian government without examination. Below the first grade comes the 'local civil service,' which corresponds more or less to the old uncovenanted service. Officials in the local civil service are mostly appointed by the authorities in India; the majority of them are Indians. Thirdly, there is the 'subordinate civil service,' which comprises the lowest range of executive posts. Candidates for the Indian civil service who enter for the competitive examinations in England must be between twenty-one and twenty-three years of age on the first of January next preceding the day of the examina-

Indian Corn. See MAIZE.
Indian Cress. See NASTURTIUM.

Indian Empire, THE MOST EMINENT ORDER OF. See ORDERS.

Indian Fig. See BANYAN TREE.
Indian Hemp. See HEMP and BHANG.

Indian Mutiny. See MUTINY.
Indian National Congress, a meeting of delegates representing the natives of India, held annually, to discuss the political claims and grievances of the native population, and to consider means of promoting native advancement. The first meeting was held at Bombay in December 1885. The chief grievances which the Congress has discussed have been the exclusive control of



Indian Army Types.

1. 2nd (Queen's Own) Madras Sappers and Miners. 2. 1st Madras Pioneers. 3. 20th Punjab Native Infantry. 4. Subadar, 15th Sikhs. 5. Native Officers, Madras Cavalry. 6. Bombay Sappers and Miners. 7. 9th Bengal Lancers and 24th Baluchistan Regiment. 8. 2nd Madras Moplah Rifles. 9. Ghurkas, parade and marching order. 10. 7th Rajputs. 11. Simnūr, Imperial Service Sappers. 12. Jenadar, Viceroy's Bodyguard. 13. 20th Madras Infantry. 14. 1st Infantry, Haidarabad contingent. (Photos 1-4, 6-8, and 10-14, Gregory; 5, H. H. King; and 9, Broome & Shepherd.)

Indian affairs by Europeans, the privileges enjoyed by persons of European birth, and the restrictions placed on the rights of free speech and public discussion.

Indian Ocean, one of the great oceanic divisions of the globe, stretches from Africa eastwards to the E. Indies and Australia, and from Asia southwards to the Antarctic Ocean. In the N. it is divided into two basins by the peninsula of India—*viz.* the Arabian Sea on the W., and the Bay of Bengal on the E. Outside these two relatively shallow arms the Indian Ocean has a uniform average depth of from 2,200 to 2,300 fathoms, except three small depressions which sink below the 3,000-fathom line. These are the Wharton and Maclear deeps to the N.W. of Australia, and the Jeffreys deep to the S. of Australia. The greatest depth hitherto ascertained is 3,232 fathoms. North of 13° S. lat. the surface water has a mean annual temperature of 80°; but from that line it gradually decreases as the Antarctic regions are approached. Below 2,000 fathoms the temperature remains pretty constant at 35° F. Along the line of 13° S. lat. a strong current of warm water flows W. towards Madagascar, and there dividing, gives rise to the swift Agulhas current, which sweeps southwards along the coast of S. Africa. This is compensated by an easterly flowing equatorial current, which remains constant all the year round, and by a cold current which runs northwards along the W. coast of Australia. Further, there is a deep-sea flow of cold water from the Antarctic, which helps to repair the loss due to evaporation. During the summer months the S.W. monsoon blows steadily towards the continent of Asia, and during the winter half-year the N.E. monsoon towards the continent of Africa. Although in great part a fairly tranquil region, the Indian Ocean is sometimes visited, especially at the changes of the monsoons, by violent hurricanes. This ocean is fed by several large rivers, such as the Indus, Ganges, Brahmaputra, Irrawadi, Salwin, and Tigris-Euphrates on the N., and by the Zambezi and Limpopo on the W. The principal islands which stud its waters are Madagascar, Mauritius, Réunion, Rodriguez, Socotra, Ceylon, and the archipelagoes of the Andamans, Nicobars, Mergui, Maldives, and Laccadives. Deep-sea investigations do not favour the existence of the fabled continent of Lemuria, on which the human race was reputed to have had its cradle.

Indians, AMERICAN. See AMERICAN INDIANS.

Indian Shot. See CANNA.

Indian Summer, a hazy atmosphere characterized by a kind of dry fog, observed in some parts of the United States in November or early in December. It is caused by dust in the upper strata of the air, due largely to the smoke of forest fires, and also to the particles from the decay of falling leaves. See HAZE.

Indian Territory, tract of land in the central part of the United States of America, with an area of 31,400 sq. m., which has been assigned to the use of certain Indian tribes, as reservations. Most of the land belongs to five so-called civilized tribes, the Cherokees, Choctaws, Chickasaws, Creeks, and Seminoles. The E. and S. parts of the territory contain portions of the Ozark Hills; the N. part is level, and contains large prairies. Much of the country is timbered, and in the S.E. is a large area of valuable pine. The Indians have made great progress in civilization. They dress as the whites do, live in houses, cultivate the soil, and have civil organization resembling in form that of the states. The land is, however, held in common, each family cultivating whatever it chooses. In recent years the country has been invaded by whites in large numbers, under various pretexts, and they now largely outnumber the Indians. With the exception of coal-mining, agriculture is practically the only industry pursued. Coal is found in the central part of the territory. Pop. (1900) 392,060, of whom Indians numbered 52,510, or 13·4 per cent.; negroes, 36,870, or 9·4 per cent.; and whites, 302,680, or 77·2 per cent.

India-rubber, or CAOUTCHOUC, is obtained as an exudation from three orders of trees—*viz.* Apocynaceæ, Artocarpaceæ, and Euphorbiaceæ—growing in tropical climates, both wild and under cultivation. The first specimens of crude rubber were brought to Europe by La Condamine in 1735, but nothing was made of the raw material until 1770, when Dr. Priestley called the attention of the public to its value for erasing pencil marks; hence the name, india-rubber. No further advance was made until the beginning of the 19th century, when Charles Macintosh and others utilized a thick varnish of rubber for waterproofing cloth; but such 'mackintoshes' were found to be easily affected by temperature, being hard in cold and soft in hot weather, whilst in addition they smelt badly. The next noteworthy

date is 1839, when Goodyear in America, and later Hancock in England, discovered the process known as vulcanizing.

The present chief source of supply of crude rubber is still S. America, but the cultivation of rubber trees is spreading rapidly in the E. Indies, the W. Indies, and Africa.

Crude rubber is collected by making an incision in the bark of the tree and hanging a tin cup or vessel under the incision, when the milky juice flows slowly into it. The juice coagulates on exposure to air; but in order to hasten the process, the juice is worked on a wooden paddle over a smoky fire, thereby coagulating it and giving it a dirty brownish-white colour.

In the modern process of manufacture, the crude rubber is boiled with water and then repeatedly passed between grooved rollers, where the sand, dirt, etc., are washed out. The resultant sheets are hung up until dry. After that the rubber is taken to the grinding mills, consisting of two steam-heated iron rollers, and ground—*i.e.* the fibre destroyed, so as to be in a fit condition to receive the compounds. These vary between wide limits. For pure rubber, sulphur is the only compound; but for cheapness, and also to suit it for various uses, zinc oxide, Paris white, chalk, litharge, lampblack, antimony sulphide, etc., are also used. After mixing, the rubber may be run into sheets by calendering—*viz.* by making the sheet of the required thickness by repeated passage through rolls, being supported the while on calico or other fabric. The sheet is now ready for vulcanizing, and is put between two steam-heated cast-iron chests, and pressure applied by means of screws or by hydraulic power.

Waterproofing.—The mixed rubber is dissolved in naphtha, worked into a stiff dough, and then spread on to cloth in a spreading-machine, which consists of a roller, on top of which is a knife or 'doctor.' The cloth to be coated is led over the roller under the doctor, which adjusts the thickness of the coat, and then over steam-heated tables at the back of the roller, which dry out the naphtha. The cloth is then ready for vulcanizing, or if it is to be double texture, it is doubled with the two rubber surfaces together. The vulcanizing is usually effected by 'cold curing' with a solution of chloride of sulphur in carbon disulphide.

Cut Sheet.—The dry rubber is put into a masticator, consisting of a fluted roller revolving inside an outer cylindrical casing, and after being masticated is put into

moulds under heavy pressure, then removed and frozen hard. In this condition it is suitable for the cutting-machine, where the rubber block is mounted on a spindle and rotated against a long, flat knife, to which a reciprocating motion is imparted. This produces a long sheet of any desired thickness, which is usually employed for making tobacco pouches, tubing, etc., the sheet being cut into the re-

phide, and white if it contains solids such as chalk or zinc oxide. Its elasticity, or rather resilience, is also dependent on the amount of such substances, of old or reclaimed rubber, and of 'rubber substitutes,' such as oxidized oils. It is unlike raw rubber in that it does not become hard when cooled, or soft and sticky when heated, and is not dissolved, but only swelled, by most solvents. Vulcanized rubber

bands; for invalid appliances, such as water-beds, hot-water bottles, and air-cushions; for mechanical purposes, as valves, washers, hose for liquids and gases, machine-belt and rollers. It is also largely utilized for tyres for vehicles, either in the solid or pneumatic form, and, on account of its high resistance, for insulation for wires.

Vulcanite, or Ebonite.—When rubber is mixed with from twenty



India-Rubber.

1. Para india-rubber plant (*Hevea brasiliensis*): height of trunk, 60 ft. 2. Flower bud. 3. Male flower. 4. Female flower. 5. Fruit of Para rubber-tree (section). 6. Seed. 7. Para bottle rubber. 8. Para bottle rubber (section). 9. Collecting caouthonc milk (Para). 10. Collecting cup. 11. East India rubber-tree (*Ficus elastica*): height of trunk, 70 to 100 ft. 12. Receptacle enclosing flowers (section). 13. Assam ball rubber.

quired shape and the seams stuck together, the joints adhering firmly after the vulcanization brought about by dipping the goods in a mixture of chloride of sulphur and carbon disulphide. Vulcanized india-rubber is a solid, the appearance and properties of which are largely dependent on the substances with which it is compounded—being black if it contains lampblack or lead thiosulphate, red if it contains antimony sul-

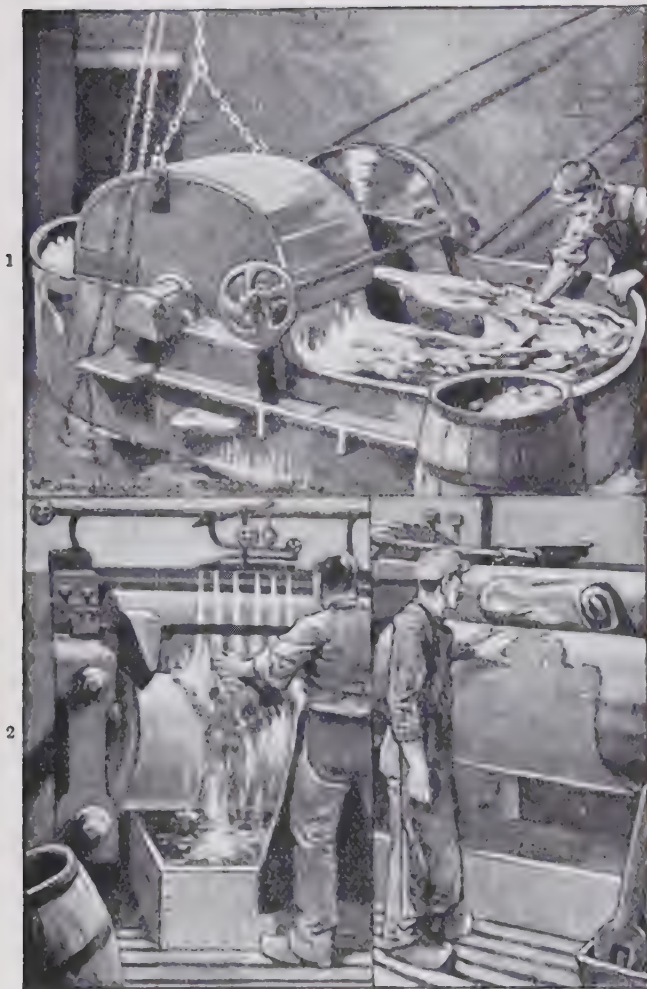
deteriorates by oxidation, especially in the light and if under strain. Raw rubber is not used to any large extent, except in a few cases where its adhesive combined with its waterproof properties make it valuable, as in the tape employed in jointing insulated wires. Vulcanized rubber is almost of universal application on account of its resiliency and resistance to penetration by air and water: thus it is used for springs, 'elastic' fabrics and

to thirty per cent. of sulphur and vulcanized, the resultant product differs entirely from rubber, being a black, hard, horny substance which takes a high polish and is an excellent non-conductor of electricity. See Braunt's *India Rubber, Gutta Percha, and Balata* (1900); Johnson's *Cultivation and Preparation of Para Rubber* (1904); Weber's *Chemistry of India Rubber* (1903); and Cook's *Culture of American Rubber* (1904).

Indicator. The indicator is an instrument for studying the behaviour of the steam in an engine cylinder. The information is supplied by a diagram traced out by the instrument on a small sheet of paper, the diagram being known as an indicator diagram or indicator card. The instrument was invented by

essentially of a small cylinder containing a nicely-fitting piston, which should work with very little friction, a small leakage of steam past the piston being of no consequence. The piston is held down by a spiral spring, the other end of which is firmly fixed to the cover of the cylinder. The piston is connected by means of

tion of the pencil is recorded on a piece of metallic paper wrapped round a drum, which is provided with clips for holding the paper or 'card' to it. A cord, having one end attached to the drum and wrapped once round a groove at the bottom of the drum, is connected with the crosshead of the engine by means of an indicator gear—the function of the gear being to give a motion similar to the motion of the piston of the engine, but on a reduced scale. This causes the drum to oscillate to and fro on its axis, a spiral spring inside the drum drawing it back during the return stroke. Several springs are provided for use in the indicator cylinder according to the pressure dealt with, the strength of the spring being indicated by a number on it giving the number of pounds per square inch pressure, corresponding to a rise of one inch of the pencil on the paper. The instrument is made so that the springs can be easily changed, and a method of adjusting the



India-Rubber Manufacture.

1. Washing machine. 2. Three roller washing machine. 3. Grinding and mixing machine.

Watt for studying the working of his engine. Fig. 1 represents a Crosby indicator, an instrument which is especially suitable for use on high-speed engines, the moving parts being very light, so as to minimize as far as possible the errors due to the inertia of the moving parts. It consists

a parallel-motion arrangement with a lever, the end of which carries the pencil (usually a brass point) for drawing the diagram, so that a movement of the piston produces a vertical motion of the pencil, the actual motion of the piston being magnified, in this case about six times. The mo-

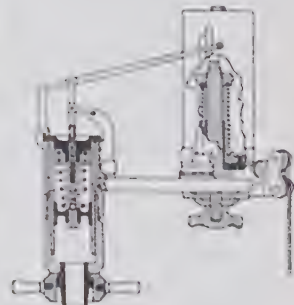


FIG. 1.—Crosby Steam Indicator.

pencil to a convenient height is usually provided. The body of the instrument is of brass, and the parallel-motion arrangement of steel. The piston is made of steel or of brass.

Fig. 2 shows the general method of connecting up the indicator. By means of the three-way cock C, and the pipes G and H, the indicator cylinder can be put in communication with either end of the engine cylinder. The cord from the drum is attached to the pin B, which copies the motion of the engine piston on a reduced scale. By having the indicator connected with either end of the cylinder the diagrams for both sides of the engine piston are drawn on the same card; but in high-speed engines a separate indicator is used for each end of the cylinder, in order that the pipe leading to the indicator may be as short and straight as possible, thus avoiding errors due to the steam being throttled on its way to the indicator.

Fig. 3 shows a typical indicator diagram for a single-cylinder non-

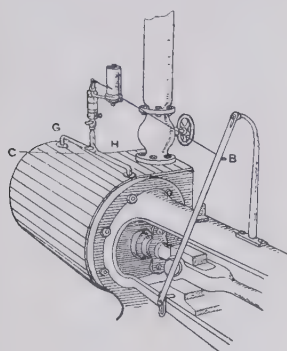


Fig. 2. —Method of connecting up the Indicator.

condensing engine. AB is the atmospheric line—i.e. the line drawn by the pencil when steam is shut off from the indicator; C is the point of admission of steam; DE, portion of stroke during which steam is admitted; E, point of cut-off; F, point of release; FG, exhaust line; G, point of compression. EF and CG are known as the expansion and compression curves respectively, and in form are approximately rectangular hyperbolas. The height (measured in inches) of any point, as H, above AB, multiplied by the strength of the spring, gives the pressure at H in pounds per square inch (above atmosphere).

The horse-power developed in the cylinder of a double-acting steam-engine is given by the formula $H.P. = \frac{2PLAN}{33,000}$, where P

is the mean effective pressure in pounds per sq. in., as obtained from the indicator diagram; L = length of stroke in feet; A = area of piston in square inches; and N, number of revolutions per minute.

Figs. 4 and 5 show the effect on the diagram of incorrect setting of the valve. Fig. 4: a, late compression; b, insufficient lead; c, late release. Fig. 5: d, early compression; e, too much lead; f, wire-drawing; g, early release. The chief errors of the indicator diagram are due to (1) the stiffness of the spring varying with

The first error may be almost eliminated by testing the spring with steam of about the same average pressure as that at which it will have to work. Errors due to inertia of the drum (negligible in slow-speed engines) and stretching of the cord may be reduced by having a light drum and using a short cord, stout wire being substituted in places where flexibility is not required. Friction of the pencil on the paper may be minimized by taking care that the point is in good order, and exerting no more pressure than is just necessary to produce a legible line. A hard lead point instead of the usual brass one will be found to give good results. The effect of pencil friction is to make the diagram too big. In high-speed engines, the diagram is often wavy, owing to the vibration of the moving parts of the indicator. If excessive, the vibration can be reduced by

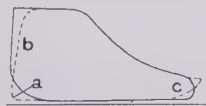


FIG. 4.

using a stronger spring. It is not desirable to damp the vibrations by pencil friction, as is often done. See W. W. F. Pullen's *Experimental Engineering* (1900).

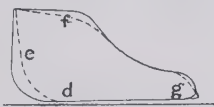


FIG. 5.

Indiction, in chronology, a cycle of fifteen years, originally a Roman term, possibly connected with the periodical publication of taxation tariffs. It was first employed in 312 A.D. The position of any year in an indiction is found by adding 3 to the dominical number, and dividing the result by 15. The remainder gives the position. There were three different starting-points in the year for an indiction—(1) the Byzantine or Greek, beginning with the 1st of September; (2) the Cæsarean, beginning with the 25th of September; and (3) the Papal, on the 1st of January.

Indictment. A bill of indictment is a written statement embodying the charge which is brought against a criminal, averring the facts on which it is founded, and stating the offence. It is presented to the grand jury, who may throw it out or return a true bill, and if found true it is read over to the prisoner. The slightest error will vitiate it, and, subject to statutory excep-

tions, an indictment for felony will not justify a conviction for a misdemeanour. Each offence must be charged in a separate count, and the indictment must not include miscellaneous unconnected charges. It is usual to end an indictment by stating that the 'act was committed against the peace of our sovereign Lord the King.' In Scotland indictments are regulated by the Criminal Procedure Scotland Act, 1887, and are only presented by the King's advocate or the procurator-fiscal on his behalf. They must state the name of the accused, the accuser—i.e. the King's advocate—time, place, material acts, and previous convictions.

Indies. See EAST INDIES, WEST INDIES, and INDIA.

Indigestion. See DYSPPEPSIA. **Indigirka**, riv. of E. Siberia, between the Yana and Kolima. It rises in the Stanovoi range, flows W., N., and N.E., and has a length of nearly 1,200 m.

Indigo, or INDIGO-BLUE, $C_6H_4 \begin{matrix} \text{NH} \\ \diagup \quad \diagdown \\ \text{CO} \end{matrix} C=C \begin{matrix} \text{NH} \\ \diagdown \quad \diagup \\ \text{CO} \end{matrix} C_6H_4$,

is generally prepared by the fermentation of a glucoside (indican), existing in a number of plants, of which *Isatis tinctoria*, grown largely in India, is the most important. The leaves of the plant are pressed into stone tanks and allowed to soak for about twelve hours in water. Fermentation, in which bacteria play a part, soon commences, with the formation of a yellow liquid, which is run off and agitated with air. The liquid turns green and then blue, and after being allowed to settle is drawn off from the sediment; it is then boiled, washed, strained off, pressed and cut up into cubes, which after drying are sent into the market. As thus prepared, indigo is a deep blue solid that chiefly consists of indigo-blue, along with other colouring matters, ash, and moisture. Natural indigo is, to a certain extent, being supplanted by a synthetical product first prepared by Baeyer, in 1870, by heating isatin with phosphorus trichloride and acetyl chloride. Since then many simpler processes have been elaborated by which artificial indigo is manufactured on a profitable scale with naphthalene, one of the chief components of coal tar, as the starting-point. Probably neither the artificial nor the synthetical 'indigos' are pure compounds, and give somewhat different results on use as dye-stuffs, British dyers preferring the natural product. Since 1895 the export from India of natural indigo has fallen from £3,570,000 to £556,500 (1904), while of the

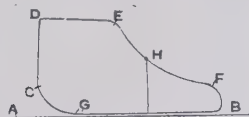


FIG. 3.

the temperature; (2) the inertia of the drum combined with stretching of the cord; (3) friction, especially the friction of the pencil on the paper.

whole world's consumpt 85 per cent. is artificial indigo. Pure indigo-blue can be obtained from the crude products by sublimation under reduced pressure, when it forms a crystalline powder with a dark purple lustre. It is reduced by many agents—such as ferrous hydroxide, fermentation of vegetable matter, etc.—to a soluble colourless compound, indigo-white, a solution of which is, in dyeing, used to saturate the fabric; afterwards taking up oxygen from the air, and re-forming indigo-blue in the fibre of the textile. On oxidation indigo yields isatin. See DYEING; and for further information, Reed's *Culture and Manufacture of Indigo* (1888), Meldola in *Jour. Soc. of Arts* (1901), Perkin in *Nature* (Nov. 1900, May 1901), Bloxam in *Jour. of the Chem. Soc.* (July 1905), and Paterson in *Oil and Colourman's Jour.* (Aug. 1905).



Indigo.

1, Flower 2, pod; 3, pod, open.

Indigo Bird (*Cyanospiza cyanea*), a member of the finch family (Fringillidae), remarkable for its beautiful blue colour. It ranges from the E. United States to Panama.

Indium (In, 114) is a rare element occurring in certain zinc ores, and is a silvery, very soft metal. It is unacted on by air or boiling water, but burns to its sesquioxide, when heated in air, with a blue-violet flame, the spectrum of which is marked by two characteristic lines. Indium partakes in general of the properties of the metals of the aluminium group.

Individual. This term has been used in the history of thought with two shades of meaning. In one it signifies an indivisible unit or atomic thing; in the other, that which is unique—a real existence with a distinctive nature of its own. 'Individuality,' in which the element of uniqueness is emphasized, is used as a rule in

a good or at least a neutral sense. See Bosanquet's *Philosophical Theory of the State* (1899).

Individualism, a term used in politics and political economy to indicate a system of society and industry where all initiative is due to individuals, and all organization and association to their voluntary agreement. It is thus opposed to socialism or collectivism, and in it the interference and activity of the state is reduced to the minimum of the maintenance of order and the enforcing of contracts. There is an extreme of individualism which would reduce or abolish even this minimum; and the anarchist writers, in their way, are simply extreme individualists. Individualism implies (1) private ownership of capital, with the corresponding rights of bequest and inheritance, and (2) competition. In the existing system there is a mixture, continually changing, of the individual and the collective principles, and the tendency at present is towards an overdevelopment of state interference.

Indo-China, or **FARTHER INDIA**, is the easternmost of the three great Asiatic peninsulas. Towards the s.w. it merges through the isthmus of Kra (10° N.) in the Malay Peninsula, which has a south-easterly trend, but presents in other respects so many distinct features that it is not usually regarded as forming part of Indo-China proper. Landwards Indo-China borders in the N. on Assam, from which it is separated by the Patkoi range, and the two Chinese provinces of Yün-nan and Kwang-si. The E. coast is washed by the China Sea, the s. by the Gulf of Siam, and the w. by the Bay of Bengal, and the seaboard is diversified by the inlets of the Tong-king Gulf on the e. and the Gulf of Martaban on the w. side. In the Bay of Bengal the Mergui Archipelago stretches for nearly four degrees of latitude (10° to 14° N.) along the coast of Tenasserim.

Indo-China has a length of over 1,000 m. at its widest part, between the Bay of Bengal and the Tong-king Gulf, and about 1,200 m. from the Chinese frontier to Cape Cambodia, its southernmost point in the China Sea. Within these limits there is an approximate area of 735,000 sq. m., with a population roughly estimated at over 34,000,000.

Apart from these political divisions, the peninsula presents a remarkable degree of uniformity in its physical, biological, and ethnical relations. It projects with a general s.e. incline from the elevated Tibetan plateau, of from which it may be regarded as a geological prolongation. In the N.W. the contracted area between

Yün-nan and the Ganges delta is scored by a number of steep ridges with intervening streams, which diverge lower down, like the ribs of a fan, developing those rich alluvial plains which form the characteristic features of the greater part of the peninsula. Thus the Arakan-Yoma, Pegu-Yoma, and Shan-Yoma ranges, with a mean elevation of from 5,000 to 6,000 feet, and enclosing the rivers Irawadi, Sittang, and Salwin in the w., correspond with the eastern (Cochin-Chinese) Coast Range, with its northern ramifications between the Mekong and Song-koi basins, while the centre of the peninsula is occupied by the vast alluvial plain traversed by the Menam and its numerous head-streams.

Heat and moisture are the essential elements of the peninsular climate during the prevalence of the s.w. monsoon, from May to September, when the rainfall exceeds 200 inches in all the western districts. From September to February the rain-bearing winds from the Indian Ocean are replaced by the much drier and cooler monsoon from the N.E. Pacific. For the whole peninsula the mean annual rainfall probably exceeds 80 inches, while the mean annual temperature lies between 70° and 80° F., the mean range being from 50° to 95° F.

Fish and rice are everywhere the staple food of the inhabitants, most of whom belong to the southern branch of the Mongol division of mankind, and speak monosyllabic toned languages of the Indo-Chinese linguistic family. They came partly from the Tibetan plateau (Burmese, Arakanese), and partly from S. China (Shans or Laos, Siamese, Annamese). Besides these, there is a considerable Caucasian element, numerous especially in Cambodia, where the dominant people are the Khmers (Cambodians proper), of polysyllabic untuned speech. To the same element belong also the Chams of Lower Cochin-China, perhaps the Talaings (Mons) of Lower Burma, and numerous smaller groups on the eastern Coast Range, and along the uplands between the peninsula and S. China. Like Hindustan, Farther India has a history of primitive cultivation, indigenous culture evolutions, foreign conquests, native combinations and disputes, etc. Beyond its modern civilization lie older half-civilizations of the more primitive tribes—Khmers, Shans, Laos, etc.—whose remains are of considerable importance and of great antiquity. Earlier still are the monuments of prehistoric man in this part of the world—the

kitchen-middens of Cambodia, and the stone monuments of the Khasi country; and earliest of all, the chipped implements discovered by Noetting in 1894 near Yenang-young, on the Irawadi, in Upper Burma, which are claimed to prove the existence of Tertiary man in this region. For bibliography and details see ANNAM, BURMA, CAMBODIA, COCHIN-CHINA, SIAM, and TONG-KING.

Indo-China, FRENCH, comprises the whole of the eastern and a great part of the northern section of the Indo-China peninsula, the frontiers towards the British and Siamese territories being roughly indicated by the Mekong River from about 28° N. to the delta. But a strip 15 m. broad on the right (west) side of the river, between Luang-Prabang and Cambodia, is virtually included in the French section, together with the whole of Cambodia itself, on both sides of the Lower Mekong. Politically this extensive tract comprises five separate divisions—the vassal kingdoms of Annam and Cambodja, the administrative territories of Cochin-China and Tongking, and the Laos protectorate, with a total area of 263,000 acres, and a population of 20 millions (estimated 1901).

The whole region except Cochin-China is under a governor-general and a resident superior for executive purposes. Cochin-China is still administered by a lieutenant-governor, directly responsible to the French minister of the colonies. Further unity was imparted to these possessions in 1887, when Annam, Tong-king, and Cambodia were grouped together in a customs union, in which the Laos territory is now also comprised. Total value of imports in 1903 was £8,170,000, and of exports £4,700,000. The chief outlay (£638,000 in 1904) is for the military forces—11,000 French and 15,000 native soldiers. In 1900 the newly acquired territory of Kwang-chi-wan was placed under the jurisdiction of the governor-general. The beginning of French influence in S.E. Asia may be traced to missionary efforts. These were begun in Siam in the 17th century, and from there spread to Tong-king and Annam. But the troublous times of the revolution in France retarded progression, and it was not till 1861-2 that the French became masters of the principal part of Cochin-China, and about the same time they established a protectorate in Cambodia. In 1882 the third republic resolved upon a highly aggressive policy, and from that year, and especially after the Chino-Japanese war, which left China in a crippled condition, the French steadily

pressed their conquests until they possessed all the country east of the Mekong. See Doumer's *L'Indo-Chine Française* (1904), and Bonheur's *L'Indo-Chine* (1900).

Indo-European. See ARYA. **Indore,** feudatory state in Central India, in the dominions of the Maharajah Holkar, lies

are poppy, raw cotton, wheat, tobacco, and valuable timber. The chief manufactures are cotton and opium. Area, 9,500 sq. m. Pop. of agency (1901) 333,000. Indore, the chief city, stands 107 m. s.w. of Bhopal. It contains the residency for Central India, the palace of Holkar, and a college (Rajkumar College) for



Bartholomae, Edm.

between Sindhis's dominions on the N. and E. and Bombay Presidency on the s. and w., and has an area of 8,400 sq. m. In the N. the state is watered by the Chambal and its tributaries, and in the s. by the Narbada. The Vindhya range, which traverses the state from E. to W., is inhabited by aborigines called Bhils. The principal products

the education of the sons of native chiefs and nobles. It manufactures cotton. Pop. (1901) 86,686.

Indorsement, anything written upon the back of a document. Sometimes when two deeds relate to the same transaction, the later deed is indorsed on the earlier. The term is also used in connection with warrants to arrest,

cheques and bills of exchange, writs of summons, pleadings, and bills of lading.

Indra, in Indian mythology, the god who stands at the head of the heaven of the gods. In Vedic hymns he is described as the relentless foe of drought and darkness. Under Brahmin influences Indra became the Siva of Hinduism, whose beneficent work is to destroy only that he may grant new life.

Indre, dep. (area, 2,664 sq. m.) of Central France. The river Cher flows through the N. border, while the Indre and the Creuse drain towards the Loire. The characteristic divisions, however, are the Champagne in the N., Brenne in the W., between the Cher and Creuse, and the Bois Chaud, much wooded and abounding in marshes, in the S. Grain is widely cultivated, as are also the vine and the sugar beet. Chestnuts are a noted product. Iron ore is the only mineral worked. The manufactures include woolen and linen weaving, paper and pottery making, and leather tanning. The chief town is Châteaurox. Pop. (1901) 288,788.

Indre. See LOIRE.

Indre-et-Loire, dep. (area 2,377 sq. m.) in Central France, drained towards the W. by the Loire and its tributaries. North of the Loire lies La Gâtine, a plateau region diversified by woods and plains. To the S. of the river, and between the Cher and Indre, stretches the plateau of Champeigne. Grain, the vine, beetroots, apples, and hemp are cultivated. Silk, ropes, paper, and bar iron are manufactured. Chief town, Tours. Pop. (1901) 335,541.

Indri (*Indris*), the largest of the lemurs. It is entirely confined to Madagascar, and is remarkable for the length of the legs, the short tail, the vivid colouring, and diurnal habits. See LEMUR.

Induction is the formality by which an archdeacon invests a clergyman with the temporalities of his benefice, usually by giving him the key of the church. After induction the parson tolls the bell to make his induction known. The fees for induction are £1, 7s. 6d. (See INSTITUTION.) In Scotland the term is commonly used in speaking of the admission of a minister to a benefice; but there is no *actus solemnus* apart from ordination by the Presbytery.

Induction was customarily defined as the process of inference by which we pass from particular data to general principles or propositions, and was thus contrasted with deduction, in which we are said to apply general principles to particular cases. And induction was further distinguished as

perfect or imperfect, according as the enumeration of the particular instance on which the general conclusion was based was or was not exhaustive. But such a view of induction is obviously inadequate, and the logic of modern science seeks to exhibit induction as a process of discovery and proof in which the character of the process, if properly carried out, is a guarantee of the truth of the results. The third book of Mill's *Logic* is an elaborate analysis of induction from this point of view. The theory of induction now perhaps most widely accepted defines it as the 'inverse process of deduction.' The process of induction in physical science may be represented as passing through the corresponding stages of framing a hypothesis assumed to be true, deducing conclusions from it, and then by comparison of these conclusions with the data from which we started verifying (or disproving) the truth of the hypothesis. See Fowler's *Logic, Deductive and Inductive* (1895), and with Mill should be compared the account of Venn in his *Empirical or Inductive Logic* (1889). See also Bosanquet's *Logic* (vol. ii. 1888), with the references there given.

Induction, Inductance. See ELECTRICITY, CURRENT.

Induction Coil. The induction coil, or Ruhmkorff's coil, is a form of electric transformer. In its usual construction it consists of a long coil of thick wire in two or three layers, wound on a core of soft iron wires of the same length as the coil. Over



Fig. 1.

this primary coil, and well insulated from it, is wound the secondary coil, which contains a very large number of turns of fine wire. Fig. 1 shows a cross-section through the middle. The alternating or reversing current

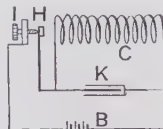


Fig. 2.

which is required for the inductive action of a transformer (see ELECTRIC CIRCUIT, *Alternate Currents*) is obtained as follows:—Current from a few primary or secondary batteries is taken round the primary coil, and

is automatically started and stopped many times per second. To the ends of the primary coil is connected a condenser, made of sheets of tinfoil and paraffined paper placed alternately. Fig. 2 shows the primary coil C and condenser K. The interrupter is described below. When the current is suddenly stopped, the self-induction (see ELECTRICITY, CURRENT) of the primary coil causes a rush of current into the condenser, thus charging the two sets of plates to a high potential. The positive and negative charges then rush together, constituting a current through the coil in the reverse direction, which by the self-induction is again forced into the plates as positive and negative charges, but with positions reversed. This action continues with gradually diminishing force at a rate depending upon the self-induction of the coil and the capacity of the condenser, and thus each stoppage of the main current results in a gradually dying away alternating current of enormous rapidity of alternation. The magnetism of the iron core is reversed with each reversal of the current, and there is induced in the secondary coil an alternating E.M.F. corresponding to the rate of change of current in the primary coil. As this E.M.F. is proportional to the number of turns in the secondary coil, a very high value may be obtained in a large coil, sufficient to produce sparks two or three feet in length, although ten or twelve inch sparks are more usual sizes. (See also ELECTRO-MAGNETIC WAVES.)

Interrupters.—To produce periodic interruption of the current, various devices are employed. The most usual pattern is Neef's hammer, which works on the principle of the electric bell. The current from the battery B, Fig. 2, passes to a screw I tipped with platinum, then to the spring H, which likewise has a block of platinum where it is in contact with the screw. The fixed end of H is connected to the primary coil, and this again to the battery. On the back of H is a block or armature of iron, and this is attracted to the core when the latter is magnetized by the current. But the movement breaks the contact between I and H, the current ceases, and the spring returns to the screw. The same action is repeated continuously, resulting in a succession of interruptions. By adjusting the distance of the screw I and the strength of the spring H, the speed of interruption and the strength of the current can be adjusted. Neef's hammer is one of the simplest forms, and, except with very large currents,

gives excellent results. Sometimes a separate small electromagnet is used to actuate the armature, and the contact may be made by a thick platinum wire dipping in and out of a cup of quicksilver. This will stand heavy currents, especially if the surface is covered with alcohol to prevent oxidation. Another class of interrupter resembles in principle those above described, but the magnetic vibrator is replaced by an electric motor. Dr. Mackenzie Davidson's pattern consists of one or more arms projecting like spokes from the axle of a motor, which dip into a bath of quicksilver as the motor revolves, and make and break contact. In others the contact is between blocks of metal which are moved to and fro by a motor. Another excellent pattern consists of a jet of quicksilver directed against metal teeth standing up round a rapidly-revolving wheel. When the jet plays on a tooth, contact is made, and the current is interrupted while the jet passes between two teeth. The wheel is driven by an electric motor, and a small pump lifts up the quicksilver to the reservoir again.

Wehnelt's interrupter consists of a platinum wire, covered except at the extreme end, dipping into dilute sulphuric acid, into which is also set a sheet of lead. The latter is made the positive pole, the wire being negative. A large electro-motive force, from 100 to 200 volts, is used, and a large current rushes through the liquid. But instantly there is produced hydrogen gas on the wire, and the great heat caused by the rush of current turns the water close to the wire into steam, so that the contact between wire and liquid is interrupted, and the current ceases. The steam condenses again, and the gas passes away, so that contact is restored, to be immediately broken again. With suitable arrangements, the rapidity of the action is very great, reaching to upwards of 1,500 breaks per second. Though not yielding the same length of spark as the previous interrupters, the spark is very intense, owing to the great rapidity of succession, so that it is convenient for Röntgen ray photography (see VACUUM TUBES), and it possesses the additional advantage that current may be taken from an electric light system, whereas this is unsuitable for the mechanical interrupter, owing to the large E.M.F.

General Arrangement.—Fig. 2 gives the diagram of the circuit for the ordinary coil, and the slight changes requisite for the various forms of interrupter are easily arranged. With the Weh-

nelt interrupter the condenser is removed, as its pressure interferes with the sudden blowing out of the liquid contact. The condenser is placed in the base of the instrument (Fig. 3). The secondary coil is insulated very

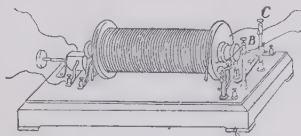


FIG. 3.

thoroughly with ebonite or mica, and it is advantageous to separate it into parts, so as to make it of several coils side by side. By this means the electro-motive force effective in any one coil is proportionally reduced, and the danger of a 'short circuit,' or spark between two parts of the winding, is much diminished.

Medical Coils.—The induction coils used for producing electric currents to be directly applied to the human body are much weaker and smaller than those for wireless telegraphy or for Röntgen ray tubes, and these precautions are not required. They are usually operated by a Neef's hammer, and the regulation of strength of current is performed by altering the number of wires in the iron core, by partially drawing the secondary coil off the primary, or by altering the number of turns in the secondary by means of a switch.

Tesla Coil.—Mr. Nicola Tesla designed a method of increasing the rapidity of oscillation of the currents in the primary circuit by using the spark discharge of the secondary coil to excite a second induction coil. In Fig. 4 C is the secondary of an ordinary

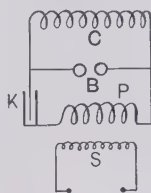


FIG. 4.

induction coil with spark balls B. To these are connected the two coatings of a Leyden jar K, which forms a small and very strong condenser, and between one coating and the spark ball is inserted the primary coil P. When the electro-motive force rises in the coil C, the condenser K is charged, and finally a spark passes across B, discharging the condenser. As before, this is not a single discharge, but a rapid oscillation of

electricity across the spark balls between the two plates of the condenser passing through the coil P. As the self-induction and capacity of this circuit are very small, the rapidity of oscillation is greatly increased, and the E.M.F. induced in the secondary coil S, wound over P, is very large. No iron core is used in this coil, since the hysteresis or magnetic friction due to these enormously rapid reversals would cause too great a loss of power. The coil P consists of a very few turns, S contains a large number, but not nearly so many are required as in the ordinary induction coil. The parts of the Tesla coil require very thorough insulation, since the pressures produced are so great. It is usual to immerse the whole coil in boiled linseed oil or resin oil, leaving only the terminals of S projecting. Tesla's coil produces wonderful effects of brush or silent discharge.

Induction coils are described in most text-books on electricity. Also see Lewis Wright's *The Induction Coil in Practical Work* (1897); A. T. Hare's *The Construction of Large Induction Coils* (1900); G. E. Bonney's *Induction Coils* (2nd ed. 1902); H. S. Norrie's *Induction Coils* (2nd ed. 1901); and Allsop's *Induction Coils and Coil-making* (1899).

Indulgence is remission by the authority of the church of the temporal punishment due to sin. In the days of strict ecclesiastical discipline all grave sins were visited with proportionate and often public penance. Keen disputes arose in the early church as to whether discipline might under certain circumstances be relaxed (cf. 1 Cor. 5:5 with 2 Cor. 2:10). Relaxations of discipline were granted in the 3rd and 4th centuries to those who had lapsed under persecution, by the interposition of 'confessors'—i.e. persons who had endured punishment for the faith. The Councils of Ancyra (308) and Nice (325) allow the bishop to use his individual judgment in cases demanding relaxation. It became customary for the penitent to make such expiation as his fault seemed to require, and by a money payment for religious purposes to gain remission of his penance. This was systematized during the crusades, when the warrior who consented to fight the infidel for the glory of God was considered to have offered a proper substitute for any penance he might have incurred. He obtained 'plenary' indulgence. Pope Innocent III. reserved the right of granting plenary indulgences. Bishops were permitted only to grant partial indulgences. This was the source of much abuse.

During the Western schism the rival popes outbade each other in the indulgences they offered. The Council of Trent does not condemn indulgences, but urges moderation in granting them. The bull 'Auctorem Fidei' (1794) of Pius VI. states that an indulgence may remit the temporal punishment which would await a penitent after death in purgatory. Of course, repentance is in every such case presupposed. See Palmieri's *Tractatus de Pœnitentia* (2nd ed. 1896); Lea's *History of*

binary; and ϵ Indi has a proper motion of $4'68''$, corresponding, at its distance of twelve light-years (parallax = $0.273''$), to a linear velocity of fifty miles a second.

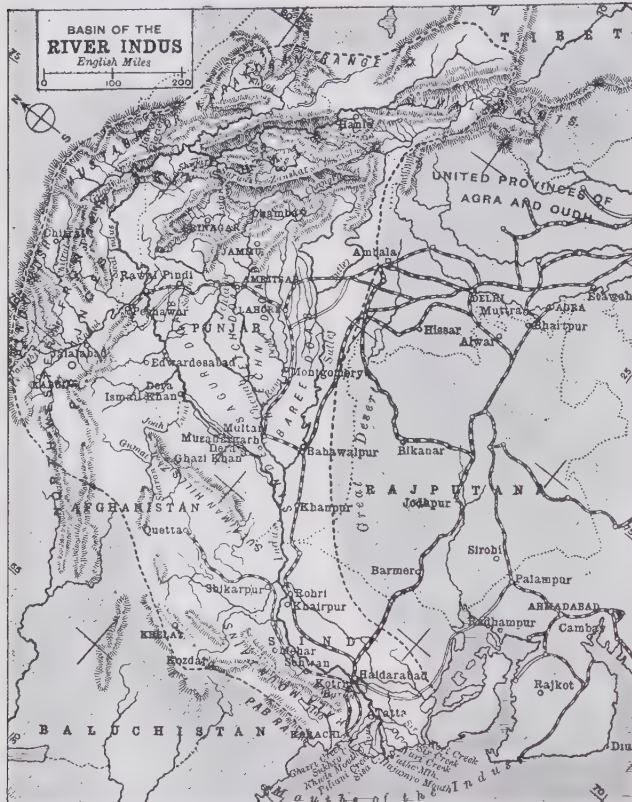
Indus, the 'King River' of Vedic poetry, rises among the glaciers of the Kailas Mts. (19,796 ft.) in Tibet, near the sources of the Brahmaputra and Sutlej. Flowing N.W. through Tibet and Kashmir, it turns S. between Gilgit and Hunza, and enters the Punjab about 800 m.

iron railway bridge at Attock and the cantilever 'Lansdowne Bridge' at Sukkur, are triumphs of engineering skill. The river often rises in destructive floods during the melting of the mountain snows (May to August). Fish abound in its waters, in which the gaval or long-snouted alligator disports itself. The value of the Indus for irrigation is enormous, the remarkable agricultural development of Sindh being due to the works carried out by the British government.

Industrial Property Convention. This union was constituted at Paris, March 20, 1893, the governments of Belgium, Spain, Portugal, Brazil, Servia, Switzerland, and Salvador subscribing. Since then Great Britain and Ireland, New Zealand, Queensland, the United States, Japan, Sweden, Denmark, Italy, Norway, and Tunis have joined the Convention; but Salvador has withdrawn, as has Turkey after a brief adherence. Every citizen of any of the contracting states enjoys in all other states of the union, as regards patents, designs, models, trade marks, etc., all advantages which their respective laws grant to their own citizens, and has the same protection as the latter, and the same legal remedy against any infringement of rights. He has also a right of priority as regards registration in the respective states. The union maintains a central bureau at Bern, and issues an official periodical.

Industrial Schools. See REFORMATORIES AND INDUSTRIAL SCHOOLS.

Industrial and Provident Societies are regulated by the Industrial and Provident Societies Acts, 1893 and 1894. Such a society must consist of at least seven members, and must take a title ending with the word 'Limited.' No member may hold more than £200 in shares. Subject to these rules, a society carrying on any industry, business, or trade may be registered by the Registrar of Friendly Societies on application by seven members and a secretary. The application must be accompanied by two printed copies of rules, which must provide for the matters mentioned in the act. A registered society must have a registered office, send its annual accounts duly audited to the registrar, provide for the privacy of each member's account, and not carry on banking if it has a withdrawable capital. Ten members who have been members for twelve months may, on giving security for costs, obtain the appointment of an authorized accountant to examine the books. The liability of a registered so-



Auricular Confession and Indulgences in the Latin Church (1896).

Indulgence, THE DECLARATION OF, a decree proclaimed by James II. in 1687, by which he proposed to extend liberties to those who were conscientiously opposed to the Established Church. Charles II. had issued indulgences of a somewhat similar kind in 1662 and 1672.

Indus, a southern constellation lying between Grus and Pavo, published by Bayer in 1603. The chief star, of 3.2 magnitude, gives a solar spectrum; θ Indi is

from its source. Near Attock, 50 m. lower down, it receives the Kabul R. from Afghanistan, and 470 m. below Attock it unites with the accumulated streams of the 'five rivers'—the Jhelum, Chenab, Ravi, Beas, and Sutlej. The delta which the river forms at its mouth covers an area of 3,000 sq. m. Owing to the enormous deposits of sand and clay brought down by the river, and to the frequent inundations, the deltaic channels are constantly changing. The total length of the Indus is nearly 2,000 m. Some of its bridges, notably the

ciety is limited. It is not liable to income tax, and a minor over sixteen may dispose by will (which must be sent in his lifetime to the office of the society) of his funds in the society. Its investments are restricted to trustee investments and a few others, but it may lend money to its members on security. Disputes may be settled by the registrar, or as provided by the rules. One-tenth of the members, or a hundred members if there are more than a thousand, may on good cause shown obtain an inspection of the society by the registrar. It may be wound up by the court as if it were a company, or by consent of three-fourths of the members.

Indy, PAUL MARIE THÉODORE VINCENT D' (1851), French musical composer, born at Paris, studied at the conservatoire there. His chief works are *Le Chant de la Cloche* (1884), based on Schiller's poem; *Sange Fleurie*, a legend; *La Forêt enchantée*, a symphonic ballad (1877); *Istar*, the overture to *Antoine et Cléopâtre*; and *Fervaal* (1897), a musical drama in three acts. He is one of the leading French composers of the day, though, owing to choice of subjects, his music does not suit the popular taste so well as that of some of his contemporaries.

Ine—Latinized Ina—(d. 726), king of Wessex, was chosen king in 688. He subjugated Kent, Essex, and Middlesex; and by his victory over the British king, Geraint (710), conquered W. Somerset. About 693 he published the earliest extant code of W. Saxon laws, whereby the great Celtic population of his kingdom was emancipated. Having abdicated (726), he made a pilgrimage to Rome, and died there. See Freeman's *Old English History* (1869), pp. 70-72.

Ineboli, seapt., Asia Minor, with a good roadstead in the Black Sea, 70 m. w.s.w. of Sinope. It is the port of Kastamuni, and exports copper, wool, mohair, etc. Total trade about half a million sterling annually. Pop. 9,000.

Inebriates. See DRUNKENNESS.

Inertia, the general property of matter in virtue of which every body tends to maintain whatever motion it may have. To start a body which is at rest, to stop a body which is in motion, or generally to change the motion in any way, we require to exert ourselves to a degree depending on the weight of the body and on the amount of motion possessed by it. When it is rotational motion which is to be given to a body, the distribution of the matter of the body with respect to the axis of rotation is of importance, and leads to the recog-

nition of a quantity known as the moment of inertia. This quantity multiplied by half the square of the angular velocity gives the energy of rotational energy of motion. See ENERGY, KINETICS.

Ines de Castro. See CASTRO.

Infallibility. The Roman Catholic Church claims absolute freedom from error in all her authoritative declarations regarding faith and morals. Her claim differs from that of the Greek Church in that the latter is retrospective only, and merely declares that the decrees of oecumenical councils are unerring. The claim, of course, rests upon the assumption that the church is the divinely-appointed teacher of the world (Matt. 28: 19; Mark 16: 15; Eph. 4: 11-16). The question is, *Who* is to be considered the mouthpiece of the church, and on what subjects may he pronounce? The answer to the first question was in early times found in the acceptance of the resolutions of general councils, or even of local councils if approved by the Pope. But the Gallican and Ultramontane parties in the Latin Church were long divided as to whether the Pope alone should have power to pronounce upon faith and morals. Until 1870 it was held that nothing was absolutely binding as an article of faith which had not received the assent of the body of the bishops. It is now required of the whole Roman Catholic Church to accept that 'when the Pope speaks *ex cathedra*, . . . he possesses the infallibility with which the Divine Redeemer was pleased to invest His church.' The subject of such pronouncements, it is generally allowed, must be only such matters as affect the preservation of truth and purity in the church. Scientific facts, etc., are not supposed to be so dealt with. The 'Old Catholics' separated from the papal communion upon this question in 1870, being led by Dr. Döllinger and Professor Friedrich. See OLD CATHOLICS.

Infamy. Persons who had been convicted of crime were formerly treated as incompetent to give evidence in legal proceedings on the ground that they were infamous. This ground of incompetence was abolished in England by 6 and 7 Vict. c. 85, and in Scotland by 15 and 16 Vict. c. 27.

Infant, FEEDING OF. For the first seven or eight months of life a child should be restricted to the mother's milk or to a substitute for mother's milk. An infant generally begins to feed from the breast within twenty-four hours after birth. The flow of milk is not usually established until the third day after labour; but because of the beneficial effect in stimulating the secretion and in

contracting the uterus, the child should be put to the breast several times in the first twenty-four hours. But continuous application to an empty breast is to be avoided. Should the child appear to be very hungry, a few teaspoonfuls of warm milk mixed with a like quantity of water may be given.

When the milk flows freely, the child should, for the first two months, be put to the breast every two hours during the day, and every four hours during the night. The test of proper feeding is a steady increase of weight from the end of the first week onwards. In the first two or three days the child usually loses a few ounces, but soon regains them. From five to seven ounces is a fair weekly gain. This rate of progress should be maintained for about five months, and at the end of a year a healthy child weighs about thrice as much as at birth. A child is usually good tempered if his food be suitable in quantity and quality. Habitual fretfulness is often due to mal-nutrition. Should the milk be at fault, as it may from ill health on the mother's part, either a wet-nurse or another substitute for the maternal milk should be employed. Generally the best substitute is good cow's milk, diluted with water, and slightly sweetened. At first the milk and water should be in equal quantities, and each month the proportion of water should be gradually lessened, until pure milk is given. Many children digest better if the diluent be not plain but lime or barley water, both of which prevent the formation of large curds in the stomach. The bottle used must be of the simplest pattern. It should have no angles and no tube, but at one end it ought to have a nipple fixed directly to the bottle. So seldom is artificial food necessary or desirable for an infant, that only upon the advice of a medical man should it be given.

When the child's teeth begin to appear, additions may be gradually made to the infantile diet. The mother's milk, if possible, must still be the main food; but, say in the middle of the day, a little broth may be given, varied with a little porridge and milk, or milk pudding. If the mother become pregnant she must stop nursing. That a nursing woman does not become pregnant is a common but erroneous belief.

In districts where fresh cow's milk is scarce, children are reared upon condensed milk, most brands of which are far too sweet. Dilution sufficient to overcome the excessive sweetness renders such milk too poor in fats and albuminates, so that the

child gets a large bulk of fluid, but too little nourishment. Unsweetened condensed milk, however, such as Loflund's, is of great use. Diarrhœa is one of the great causes of infantile mortality. Improperly-fed children generally improve after a small dose of castor-oil, which empties the intestines of irritating food. Subsequently the child should be starved, or should have only small quantities of light food, for twelve or twenty-four hours. When the patient is greatly exhausted, raw beef juice in small but frequent doses may be given. For a few days after the diarrhœa has ceased the child should receive only milk and lime-water, the milk gradually being increased until the proper proportion for the age has been reached.

The quantity of food given at a meal must, of course, vary to some extent with the appetite and digestion of the individual. The following is a table of approximate quantities of mother's milk, or its equivalents (Dr. John Thomson):—

Age.	At each feeding.	In twenty-four hours.
1 week . . .	1 oz. . .	10 to 15 oz.
1 month . . .	2 oz. . .	1 pint.
5 months . . .	4 oz. . .	1½ pints.
9 monts . . .	7 oz. . .	2 pints.

In from fifteen to twenty minutes a healthy child will empty the breast. In this connection, one may warn mothers against soothing powders, etc., which act by more or less stupefying a child, without removing the cause of discomfort.

Infant (legal). All contracts entered into by infants to repay money or pay for goods supplied—except contracts for necessities—are void. What is necessary is a question of fact, and varies with the social and financial position of the infant. On coming of age, a promise made by an infant cannot be ratified, even if there be a new consideration (37 and 38 Vict. c. 62). An infant cannot be liable on a bill of exchange, though given for necessities. Sending invitations to infants to borrow or bet are misdemeanours punishable with fine and imprisonment. If such invitation be sent to an infant at a college or a university, the presumption is that the sender knew of the infancy (Betting and Loans Act, 1892, and Money-lenders Act, 1900). Under the Infant Settlements Act, 1855, infants may, on marriage, make valid settlements of their property; but the act does not apply to a male under twenty, or a female under seventeen. An infant may be appointed administrator or executor, but he cannot act till of full age. An infant

cannot be made bankrupt except perhaps in respect of necessities supplied. An infant under seven years of age is incapable of crime; between seven and fourteen the presumption that there is no intent may be rebutted. There are no infants in Scotland; but see MINOR, and PUPIL.

Infanta, title given in Spain and Portugal to princesses of the royal family, corresponding to the title *Infante*, applied to royal princes; but the heir to the Spanish throne is distinguished as 'Prince (or Princess) of the Asturias.'

Infantes, tn., prov. Ciudad Real, Spain, 48 m. E.S.E. of Ciudad Real, in a wine district. Pop. (1900) 8,095.

Infanticide. Among ancient nations, infanticide, or the killing of children just after birth, frequently prevailed as a legal or customary institution. The ground of the practice was generally the inability of the parents to provide for all their children, or at least to provide for them in a manner befitting the class or caste to which they belonged. Thus it was generally girls, or deformed or sickly infants, that were put to death. Even in nations of such high civilization as the Greeks and Romans infanticide was very common, and was defended by such great philosophers as Plato and Aristotle. Among the tribes of British India, both high class and low, infanticide, particularly of girls, was practically general, until the British government took strong measures to put an end to it about the beginning of the 19th century. At the present day it is almost entirely among uncivilized peoples that infanticide exists as a recognized and approved practice.

The principal cause of infanticide in civilized countries is the desire to conceal the fact of birth, and the crime is therefore closely connected with illegitimacy. Infant life insurance has no doubt conduced to the death of many young children, but rather as supplying a motive for neglect than for the active destruction of life.

In some countries infanticide is treated as a special kind of crime, but in Britain the law makes no such distinction. Like all other killing which involves criminal liability, the offence is murder if deliberate, and manslaughter if not. As the crime is thus unjustifiable homicide of some kind or other, it is necessary to prove that the child was born alive, and died after birth, in consequence of injuries inflicted either before, during, or after birth. It is not necessary that the child should breathe if

it is completely born in a living state. In England, a woman may be acquitted of murder and manslaughter and yet punished, under 43 Geo. III. c. 58, for concealment of birth; and in Scotland, if a woman conceals her pregnancy, and calls for no assistance at the birth, and the child is found dead, she may be punished, under 49 Geo. III. c. 14, for concealment of pregnancy, with a maximum penalty of two years' imprisonment. See ABORTION, and INFANT LIFE PROTECTION.

Infant Life Protection. The Infant Life Protection Act, 1872, was passed to prevent the evils of 'baby-farming.' It was repealed by the Act of 1897. The local authorities are—in Scotland the parish councils, and in England and Ireland the boards of guardians, except in London, where the county council and the common council of the city are the local authorities. Any person receiving for hire or reward more than one infant under the age of five years for the purpose of nursing or maintaining them apart from their parents for more than forty-eight hours, and any person receiving an infant under two years in consideration of a sum of money not exceeding £20, and without an agreement for further payment, must within forty-eight hours give notice to the local authority. It is the duty of the local authority to provide for the execution of the act, and to give such public notice of its provision as a secretary of state may direct, and to appoint inspectors where necessary to enforce the act, and to fix the number of infants that may be received in any dwelling of which notice has been given. It is the duty of inspectors to inspect the infants and the premises in which they are received, to satisfy themselves as to the proper maintenance of the infants, and to give advice and directions as to such maintenance. If an inspector finds that any infant is kept in a house which is so unfit or overcrowded as to endanger its health, or is retained by some person who, by reason of negligence, ignorance, or other cause, is so unfit to have the care of it as to endanger its health, he may apply to the local authority for an order for its removal to a workhouse or a place of safety. If an inspector is refused admission to any premises where he has reason to believe infants are kept in contravention of the act, he may apply to two justices or a stipendiary magistrate, or in Scotland to the sheriff, for a search-warrant. In the case of the death of an infant coming under the act, the person having the care of it must give notice

within twenty-four hours to the coroner (in Scotland to the procurator-fiscal), and an inquest must be held, unless the coroner is satisfied by the certificate of a doctor who has personally attended or examined the child that there is no ground for doing so. The act does not apply to the relatives or guardians of an infant, or to poor-law institutions, or to hospitals, convalescent homes, or institutions established for the protection and care of infants, and conducted in good faith for religious or charitable purposes.

Infant Schools. Infant education has been very generally regarded as falling between the years of three and seven. In Greece and in Rome the seventh year marked the beginning of more or less formal education, though Quintilian complained that this involved too late a beginning. In the *Republic*, Plato would remove children at birth to a sort of state nursery, where they would be cared for and educated up to the age of seven. The work that Plato suggests for this stage has a certain affinity with that of the modern kindergarten. On the other hand, Comenius, in his *School of Infancy* (D. C. Heath, 1896), describes a somewhat ambitious scheme for the home education of children up to the age of six. In any case, as an actual part of a system of education, the infant school did not make its appearance till the second last decade of the 18th century. Waldbach in Alsace and New Lanark in Scotland are both claimed as the cradle of the infant school. The French institution preceded the Scottish by a few years, but the two institutions originated quite independently of each other. The scientific development of infant education, however, must be sought in Switzerland and Germany, where Pestalozzi and Froebel worked out the theory and practice of the system connected with the kindergarten. (See KINDERGARTEN.)

At the early stages in the history of infant schools there were clearly present two distinct aims. There was first the purely economic or philanthropic aim of caring for young children whose parents, either from indifference or from the pressure of poverty, were unable to attend satisfactorily to their upbringing. The *école maternelle* in France carries on education for children between two and six. The work is really preparatory to more advanced education; but the original nature of this class of school is clearly shown in the old name, *salles d'asile*. The second aim, always present, though frequently obscured, is to

secure a scientific preparation for the more formal education of later years. Many writers (e.g. Locke) hold the view that the earliest years of childhood are useless for education. There has to be a period of marking time. This is recognized also in Rousseau's famous paradox, that the teacher's main business is to learn how wisely to lose time. Other writers maintain that education cannot be begun too soon. Froebel, in fact, says that, to be really successful, it ought to begin at the annunciation. Apart from purely kindergarten institutions, there are infant schools to be found throughout the whole of the United Kingdom as an integral part of the elementary educational system.

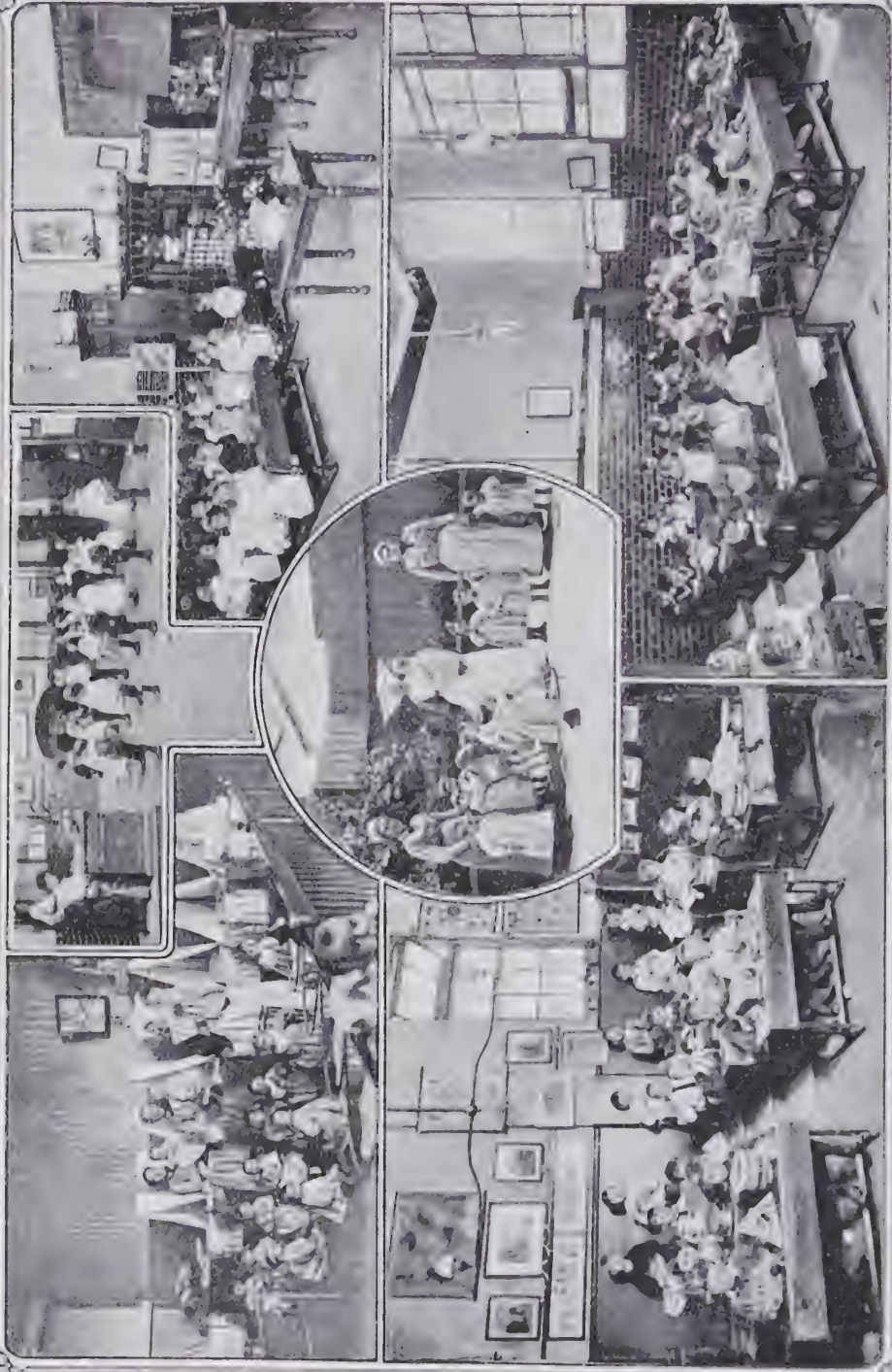
Infantry is the most important of the three arms which constitute the bulk of the fighting force of an army. In the rifle fire with which it paves the way to the final assault of a position, and with which, when on the defensive, it resists an attacking force, it possesses the main characteristic of artillery—*viz.* 'fire action.' In the last stage of the attack it makes use of the chief power of cavalry—*viz.* 'shock action.' In camp and bivouac, infantry safeguard the army in the trying and wearying duties of outposts.

Organization and Formation.—In line, infantry forms up in two ranks; the frontage of a battalion of 800 men is roughly 300 yards. The length of a column marching in 'fours' is the same. The usual rate of marching varies, but may be taken as three miles an hour. Knowledge of 'space and time' is useful for scouts and patrols, as, if the time taken by a column to pass a certain point is known, its strength can be approximately calculated. The weight carried by a British infantry soldier is 58 lbs. 9½ oz., increased by about 3 lbs. if carrying a pick or shovel.

Training.—The physical and moral powers of the soldier must be heightened by discipline, drill, marching, and musketry; but a new factor in his training has arisen—his mental power must be developed to the utmost. This factor arises from the 'individual' system of modern fighting. No longer does he advance in line, almost touching a comrade on either hand, every movement by word of command. For half a mile, perhaps longer, during a fight he must advance of his own accord, crouching and crawling from cover to cover over a wide fire-swept zone, his companions at wide intervals from him, often invisible. To do this effectively, and yet to do it so that he forms a part of one

collective whole, he must be trained by constant practice in peace to use his wits, so that when in war the object of his attack is pointed out to him, he will be able to grasp the situation quickly, and by an intelligent execution of his orders contribute to the success of the movement. The officer, of course, must be trained to maintain control over his men as long as possible, but the moment must come in every fight, especially in the attack, when the individual soldier must think for himself; and for the perfecting of his fighting powers the latter must learn not only self-reliance, but confidence in his comrades.

Attack.—It seems certain that no attack can be carried to a successful issue unless the enemy's fire is overwhelmed before the final assault is delivered. This means that when the attacking infantry has got within effective range of the position, its forward movement must be combined with a well-directed and heavy fire. The attack is usually made in three lines. Suppose an infantry division is attacking a position. To each of its two brigades is allotted a portion of the enemy's position, varying in length, but averaging about 600 yards. One brigade will place two battalions, say, in the first line, and one each in the second and third. Marching in column, sheltered by hills, etc., it finally reaches a point where it becomes exposed to the enemy's artillery fire, the distance of this point from the enemy's position depending on the nature of the ground. Here the first line extends, with the men several paces apart, each battalion placing, say, two of its companies as a firing-line, two others a short distance behind as supports, and four others behind them again as a local reserve. By slow degrees the first line advances, the men taking advantage of every available piece of cover—hedges, trees, ditches, etc. The supports and reserve gradually reinforce the firing-line, replacing casualties in it, until both are absorbed in it by the time decisive range—*i.e.* 500 yards from the position—is reached. From here every effort is made to overwhelm the enemy with a well-sustained fire, and to push forward as far as possible. At last comes a time when no further advance can be made, and then both sides strive for the mastery in fire. Meanwhile the second line, which started about a quarter of a mile behind the first, has gradually been closing up with it. When the attack has finally gained a superiority of fire over the defence, the second line joins the first, bayonets are



Infant Schools at Home and Abroad.

1. Crèche kept by the sisters of St. Vincent de Paul, Paris (before the expulsion).
2. Roll call, Denmark Hill School, London.
3. Kindergarten, Denmark Hill School.
4. The sisters of St. Vincent de Paul and their charges awaiting expulsion.
5. Baking-making.
6. A class at work, Denmark Hill School.

fixed, and the position is charged. The third line is held in reserve a variable distance behind, ready to follow up a victory, or to cover with its fire a retreat in case of repulse. The enemy's fire, however, may never be sufficiently subdued for an assault to be made with any reasonable prospect of success. The attack can then either retire at nightfall, or can strengthen the position it has already taken up with shelter-trenches, etc., and renew the fight on the following day.

Defence.—In defence, as in the attack, infantry are arranged in three lines. The duty of the first line is to bring an overwhelming fire along the front of the position, so men are crowded into the firing-line as thickly as is consistent with an efficient use of the rifle, supports are placed handy for replacing casualties, and local reserves for the same purpose and for reinforcing the firing-line at specially threatened points. The second line is placed behind the first, in such positions that it will be able to guard against any flank attacks. The third line, or general reserve, remains massed in some spot from which it can make an effective counter-attack on the enemy's assaulting columns, opportunities for which often occur from the severe shaking the latter receive during their advance. This counter-attack has been called 'the soul of the defence.' See Black's *Modern European Tactics* (1899); James's *Handbook of Tactics* (1895); *Modern Strategy* (2nd ed. 1904); Home's *Précis of Modern Tactics* (1896); *Infantry Training* (1902); and numerous works in French and German.

Ammunition Supply.—Musketry, too, is a part of the infantryman's training that yearly becomes more important—not only the art of shooting straight, but that of husbanding ammunition. Unless a very efficient 'fire-control' is maintained, the expenditure of ammunition becomes enormous, and the question of supplying the firing-line becomes more difficult as the action progresses. Considering the scattered nature of the attack, an efficient fire-control is difficult to maintain throughout the whole advance, and finally the individual intelligence of the soldier—developed in peace—must come into play. Of the 309 rounds of ammunition provided for each man, 100 are carried on him, 77 by the regimental carts and mules of the battalion, 77 by the divisional ammunition column, and 55 in the ammunition park. On going into action 50 extra rounds are issued to each man. Two mules accompany the supports, the ammunition being

distributed by carriers; two carts follow with the remainder of the regiment, and two with the brigade ammunition reserve.

There are 156 battalions of infantry in the British army, of which ten compose the brigade of Foot Guards. In most modern armies the proportion of infantry to cavalry is about six to one, while in the British army it is as eight to one.

Infarct, in medicine, signifies any infiltration of an organ; but the term is usually restricted to

plies the presence of a living specific germ or micro-organism, although the germs of all infectious diseases have not yet been identified. Prevention of infection is best effected by isolation of infected persons.

The following table, somewhat abbreviated from one issued by the Association of Medical Officers of Schools, gives approximately the period of incubation, appearance of typical rash, quarantine, etc., in the case of the commonest infectious diseases:—

Disease.	Incubation.	Date of eruption after definite illness begins.	Quarantine after exposure to risk.	Infection ceases.
Whooping-cough	Days. 7-14	Days. Whoop may not appear for some weeks, if heard at all.	Days. 21	Five weeks from commencement of illness, provided the characteristic spasmodic cough has ceased for at least two weeks.
Scarlet fever....	1-8	2	10	At least six weeks from beginning.
Measles.....	10-14	4	16	Two weeks or more from coming of rash.
Mumps.....	10-22	None.	24	Seven days after disappearance of all swelling.
Smallpox.....	12-14	3 or 4	16	When all scabs have gone.
Typhoid.....	7-21	8 or 9		
Typhus.....	5-14	5	14	Four weeks.
German measles.	7-18, or more.	2-4	20	Ten days after rash disappears.

a hæmorrhagic infiltration, such as follows an arterial embolism.

Infection, a term used to describe the method of transmission of disease from one individual to another, and popularly applied to any disease capable of transmission. In a more limited sense it is opposed to the word *contagion*, and is restricted to those diseases which may be transmitted without actual contact of the individuals, or without obvious application of the virus to the body of the second patient. Infective material is therefore air-borne, and generally enters the body by the respiratory system. Whether a disease is strictly infectious or only contagious cannot always be decided. Pulmonary tuberculosis—i.e. consumption—is a good example of infectious disease, and its highly transmissible nature has only lately been fully recognized. The specific micro-organism is air-borne, and in a dusty corner may lie for a long time alive and virulent. Typhoid fever is infectious, and apparently is mostly water-borne. Smallpox is an example of a disease which is both infectious and contagious. Infection im-

Infeittment, or **SASINE**. In Scots law it was formerly necessary, in order to give a title to heritable property, that possession should be given by certain symbols, as earth and stone for land, or clap and happer for mills. The symbols were delivered on the lands by the bailie of the superior to the attorney of the vassal, and an instrument of sasine subscribed by a notary and two witnesses was recorded as the proper evidence that sasine had been given. Important changes were made in 1845 (8 and 9 Vict. c. 35), and it became no longer necessary to deliver possession on the land. Since 1858 (21 and 22 Vict. c. 76) it has been sufficient for the person in whose favour a conveyance is granted to record the conveyance itself in the appropriate register of sasines.

Inferi, in Roman mythology, the gods of the lower world, as distinguished from the *superi*, the gods of heaven; the chief of them were Dis (or Pluto) and Proserpine. But the term is often used to include all the inhabitants of the lower regions—e.g. the Furies, Cerberus, Charon—and also the souls of the dead,

Inferior Courts. In England all courts are called inferior courts whose jurisdiction is limited, and subject to the superior jurisdiction of the High Court of Justice, which may compel them by writ of mandamus to exercise their jurisdiction, or restrain them from exceeding it by writ of prohibition, or remove any cause or matter into the High Court by writ of certiorari. The criminal jurisdiction of inferior courts is for the most part exercised in boroughs by the borough justices, stipendiary magistrates, and the recorder, and in counties by the county justices. Of inferior courts of civil jurisdiction, by far the most important are the county courts. Many of the more ancient cities and boroughs have by custom or charter the right to hold a civil court of record, but their jurisdiction is now very limited. The most important are the Mayor's Court of the City of London and the Court of Passage at Liverpool. The chancellors' courts of the universities of Oxford and Cambridge had formerly very large jurisdiction in matters ecclesiastical, criminal, and civil. Cambridge lost most of its privileges by an Act of 1856; but at Oxford the chancellor's court still exercises a wide jurisdiction in civil matters, and the chancellor, vice-chancellor, and the deputy of the latter, are justices of Oxford, Oxfordshire, and Berks, in cases where members of the university are concerned. As to manorial courts, see MANOR.

Infidel, literally unfaithful or unbelieving, one who does not accept a certain religion: applied by Christians to non-Christians, by Mohammedans to Christians. Christian usage now applies it to those who deliberately reject Christianity, such as atheists, deists, or agnostics.

Infinite signifies what is opposite to the finite and free from its limitations; hence it is used substantively to denote God, who is 'the Infinite.' It is now usual in philosophy to distinguish, after the manner of Hegel, between a lower or false notion of infinity, as mere immensity or indefinite extension, and a higher or genuine notion of infinity as that which transcends finite limitations. The character of the finite as such is that it is limited from without, and to get the true notion of infinity it is not enough merely to set back this external limit indefinitely far. On the contrary, it is only when such limitation from without is altogether transcended that we get the true notion of infinity—*viz.* as that self-sufficient existence in which all determination is internal, and in which, therefore,

determination is no longer in any degree a restriction, but simply the expression of the nature of this existence itself. On the question whether the Infinite can be known, see HAMILTON, SIR WILLIAM.

Infinite, Infinity, in mathematics, are conceptions of far-reaching significance. Arithmetically we meet with infinity as the reciprocal of zero, and it is regarded as the limiting value of the reciprocal of $\frac{1}{n}$ as n is

taken smaller and smaller. In geometry various kinds of infinities are considered. Thus, a curve is made up of a singly infinite succession of points, a surface is a doubly infinite set of curves, and space is a trebly infinite collocation of planes. In what is known as Euclidian space all straight lines and planes pass off to infinity; but self-consistent systems of geometry have been defined and discussed in which straight lines are not infinite, although they are unbounded—*i.e.* have no determinate boundaries. See GEOMETRY, NON-EUCLIDIAN.

Infinitesimal, a mathematical term signifying a quantity which may be taken smaller than any assigned value. The differential and integral calculus is frequently called the infinitesimal calculus. It is in this branch of mathematics that the properties of infinitesimals are studied. See CALCULUS, INFINITESIMAL.

Infirmary. See HOSPITALS.

Inflammation may be defined as the reaction of the tissues to an irritant; and the term irritant includes physical and chemical agents, heat and cold, a crush or a blow, as well as those toxic agents known as micro-organisms. Celsus (b. about 50 B.C.) is said to have enumerated *rubor*, *tumor*, *calor*, and *dolor* ('redness,' 'swelling,' 'heat,' and 'pain') as the four marks of inflammation; and although these four cardinal signs are not necessarily all present in every inflammation, they to some extent furnish an index to the severity of the process. The first result of irritation of the tissues is hyperæmia, or increase of the local blood-supply by dilatation of the vessels and consequent acceleration of the blood stream, which, however, may be evanescent. As the current through the veins slows down, the white blood corpuscles, or leucocytes, cling to the vessel walls, while the red corpuscles pass on through the centre of the lumen. After a time immense numbers of leucocytes, with a copious exudation of lymph, pass through the vein walls into the extravascular tissues. In severe inflammation a certain number of red blood cor-

puscles also find their way through the walls of the engorged capillaries. The cause of this process, which is known as diapedesis, lies in a degenerative change in the vessel walls. Should the inflammatory lymph be retained for long in the tissues, or should it be poured out on a serous surface like the peritoneum, it coagulates; while the emigrated leucocytes proliferate, and, with the wandering cells of the tissues, assist in the process of repair by removing the debris of the damaged parts and such toxic agents as micrococci. Metchnikoff has demonstrated the destruction of bacteria by these white blood-cells. In the course of this struggle many of them die, and pus consists of myriads of these dead corpuscles. Besides removing bacteria and the debris of damaged tissues, the blood corpuscles and cells derived from the fixed tissues conduct the process of repair by organizing the exuded lymph into firm connective tissue. The formation of the more highly specialized tissues is beyond their power. The most favourable termination of acute inflammation is resolution, which leaves practically no material trace of the process. In many cases, however, acute inflammation subsides into a chronic state, which often leads to great increase in the connective tissue of an organ. This increase leads at first to enlargement, but as the connective tissue contracts atrophy results eventually. If at all extensive, acute inflammation is attended by rise of temperature and by general malaise, especially when pus is formed and retained in a confined space. Rigors may follow the formation of pus, or the spread of the inflammation and the septic organisms by the lymphatics to new centres of infection.

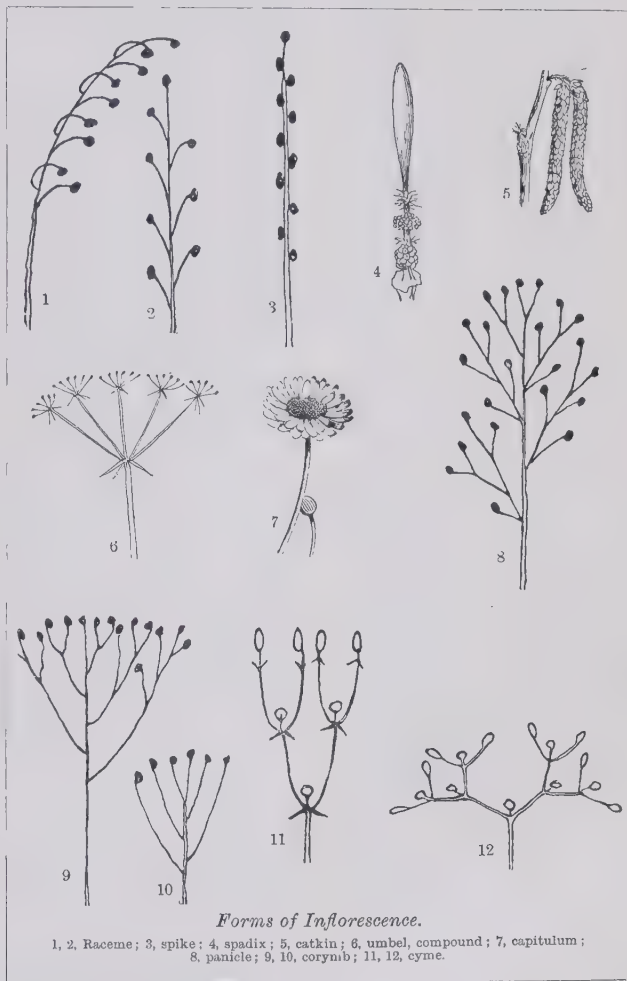
Treatment.—When at all possible, an inflamed part should be put at rest, and the engorgement of the vessels should be relieved by elevation of the part, by counter-irritation, by purgation, by the application of cold or of astringents, and in some cases by bleeding. Antiseptics are often of value when the site of the inflammation permits their application. Physiological rest of an inflamed organ is highly desirable, and treatment should be adapted to secure this. Thus, if the kidneys be inflamed their work should be lightened as far as possible by the administration of purgatives and diaphoretics, which throw the burden of excretion upon the bowels and skin. Should pus form, or even threaten to form, in an inflamed part, early and free incision is in nearly all cases advisable.

Infection. Grammatical infection either indicates the relation of the infected word to others in the same sentence (*e.g.* by case endings), or denotes some aspect of the conception which the word expresses (*e.g.* by tense forms). It is an important feature in the Semitic and Indo-European languages, but outside of these groups does not appear to be common. Prefixes and suffixes that are inflectional in a strict sense have no independent existence or significance. Presumably, however, the earliest of them were at first actual independent words, whose transformation lies beyond the reach of historical inquiry. The Indo-European parent language possessed a most elaborate system of inflections. The daughter languages have greatly modified and to a large extent disused the inflections transmitted to them. The history of the English language itself exemplifies this process of change. Early English was much more highly inflected than modern English now is. The complete loss of the old adjective inflections (for gender, number, and case), and the disappearance of the special case forms of the nominative, accusative, and dative of nouns, may be given as illustrations of the changes which have taken place. See also GRAMMAR.

Inflorescence is the method of arrangement of the flowering branches in a plant, and of the flowers upon them. The simplest form in the flowering shoot bears but a single flower at the termination of the main axis, as in the tulip; or in the axils of the leaves, as in the pimpernel or the dog violet. It is, however, with systems of fertile shoots that inflorescence is concerned; and the numberless modifications are, generally speaking, in the direction of the aggregation of the flowers themselves and the reduction of the foliage leaves, with the result that the flowers become more conspicuous to, and are more readily reached by, insects. The principal forms may be reduced to two groups—(1) *monopodial*, or *botryose*, in which the branching is for the most part confined to the main axis of the plant; (2) *sympodial*, or *cymose*, in which the lateral axes outtop and grow more vigorously than the main axis. In the simplest forms of monopodial inflorescence the lateral axes are unbranched. The raceme has the main axis elongated, and bears stalked flowers, as in the barberry, currants, and mignonette. When the flowers are sessile, as in the plantain and the mullein, the inflorescence is a spike. If the axis of the spike

is fleshy, as in the common arum, it is called a spadix; and a catkin is a unisexual spike that drops after flowering—willow, birch, poplar. In the umbel and the capitulum the main axis is contracted: in the former the flowers are stalked, as in the crowslip; and in the latter sessile, as in the daisy. In the panicle

flowers are borne on the same side of the new axes, thus resembling a one-sided raceme; scorpioid, when they occur alternately on opposite sides, as in a typical raceme; and dichasial, in which a secondary axis is given off on each side, just below the terminal point of the main axis. Examples may be seen in the day-lily, the



Forms of Inflorescence.

1, 2, Raceme; 3, spike; 4, spadix; 5, catkin; 6, umbel, compound; 7, capitulum; 8, panicle; 9, 10, corymb; 11, 12, cyme.

the lateral axes are branched, as in the horse-chestnut and lilac. It may be compared to a raceme, in which each pedicel or flower-stalk is branched. The corymb (elder and hawthorn) is by some regarded as a flattened panicle, by others as derived from the raceme. Of sympodial or cymose inflorescences there are three types: helicoid, in which the single

forget-me-not, and the bladder campion respectively.

Influence Machines, ELECTRIC. See ELECTROSTATIC MACHINES.

Influenza, an infectious epidemic disease which received its present name from the Italians in 1741. In 1889 another alarming epidemic appeared in the Far East, and swept over Eu-

rope with extraordinary rapidity. Since then it has appeared epidemically every year in some part of the British Isles, and generally has been very widespread. Sufferers are often attacked a second time, or even a third, when barely convalescent from the first seizure. Indeed, in some cases one attack appears to confer upon its victim a predisposition to the disease. The infective agent is a minute bacillus discovered by Pfeiffer and Canon. Its period of incubation is very short, sometimes less than twenty-four hours, and while the bacillus is extremely virulent during the early stage of the disease, it has the power of forming toxins, which continue to poison the system after the apparent recovery of the patient.

The illness generally begins with a shivering fit, after which come general discomfort, aching of the limbs, and rise of temperature. Headache is a prominent symptom, and is often most severe behind the eyes. In the limbs the pain is deep 'in the bones,' but is not attended by any redness or swelling, nor is it confined to one limb or joint. Other symptoms depend upon which organs are most involved. Sometimes there is frequent vomiting; sometimes coughing, sneezing, and running from the eyes are the leading discomforts. The acute stage lasts three days or a little more, after which, if proper care has been taken from the onset, and if no complications arise, recovery begins. The great dangers of influenza are due, however, to the exhausting effect which the poison has upon vital organs, and to the fact that the sufferer is, for a considerable time, more prone to contract other disease. Chest troubles are probably the commonest complications. Premature exertion after influenza may lead to permanent heart disease, to ruined digestion, or to hopeless damage to the nervous system.

Treatment.—As with other infectious diseases, influenza fastens most readily upon those whose health is below par. In treating an attack, the most important thing is to send the patient promptly to bed in a warm room, and to keep him there until at least twenty-four hours after all active symptoms have disappeared. Light food should be given frequently, but in small quantities at a time. The great dangers in influenza are delay in going to bed and hurry in leaving it. Under such conditions there is constant risk of a serious chill, or of heart-failure. Apart from complete rest, the treatment is mostly that of the symptoms. The pains are eased

by warmth, hot bags of salt being very comforting to the aching limbs. Phenacetin, antipyrin, and other antipyretics and analgesics are often given; but their effect has to be very carefully watched, and they must be stopped as quickly as possible. Stimulants are recommended by most authorities, especially in the low condition which follows the acute fever. Alcohol is sometimes serviceable in the form of well-diluted whisky or dry champagne, but it should not be given except after food, and then only in small quantity. When the leading symptoms point to nervous complications alcohol should be stopped, or should be used with great caution. At the onset of an attack small doses of mercury or some other purgative may be given, and hot drinks are useful through their action on the skin and kidneys. For the cardiac irregularity which frequently follows the acute stage of influenza, heart tonics such as digitalis and strophanthus should be administered. Influenza often ends fatally when no precautions are taken. The great depression following a severe attack is best combated by rest and moderate amounts of alcoholic or other stimulants, with such nerve tonics as strychnine, syrup of hypophosphites, etc. If the patient be a good sailor, a short sea voyage is generally more beneficial than any drug. For those who do not like the sea, a few weeks' residence at a watering-place amid cheerful surroundings is almost as serviceable.

In Formâ Pauperis. In England the right to sue or defend an action *in formâ pauperis* ('in the character of a pauper') is now regulated by the rules of the supreme court. Order xvi. (Rules 22-31) provides that any one may sue or defend as a pauper on proof that he is not worth £25, his wearing apparel and the subject-matter of the cause alone excepted. A person desiring to sue as a pauper must obtain the opinion of counsel that he has reasonable grounds for proceeding, and must make, or obtain from his solicitor, an affidavit that a full statement of the facts has been laid before counsel. A person admitted to sue or defend as a pauper pays no court fees, and the court or a judge may assign him a counsel or solicitor, or both, to assist him, who may not refuse to do so without good reason. For the practice in Scotland, see POOR'S ROLL.

Information. In English law this term has more than one meaning. It may mean a charge upon oath laid before a justice or justices of the peace with a view

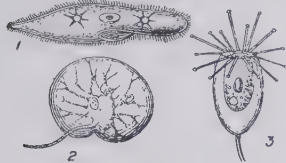
to a summary conviction; or a complaint by a common informer to recover a penalty under a penal statute (see INFORMER); or a complaint by the attorney-general in the name of the crown in revenue cases to recover penalties for offences against the customs or excise laws; or a criminal information, which may be laid by the attorney-general for any offence less than treason or felony, and in certain cases by a private person with the leave of the court and in the name of the attorney-general. Leave to file a criminal information will usually be granted in cases of serious libel, or in the case of offences by magistrates and public officers in the exercise of their duties, or in the case of offences against the administration of justice, such as attempts to influence a jury, and also in the case of election offences, bribery, and breach of the peace.

Informer. Many English statutes provide that the penalties for breaches of the law shall go either wholly or partly to the informer who brings the action in the name of the crown. By a statute of 1589, all such actions for penalties, if brought by a common informer, must be commenced within one year of the offence. See also QUI TAM.

Infusions, in medicine, are those preparations in which the active principles of certain plants are extracted by water at a lower temperature than boiling point. The temperature of the water and the period of infusion vary, and are regulated by the solubility both of the active principles desired and of the other ingredients of the crude drug. Tea may be cited as an example, in which water just under boiling point is employed to dissolve out theine from the leaves, insufficient time being allowed for the extraction of the less soluble and harmful tannic acid. Medicinal infusions often contain spirit, which is added for preservative purposes.

Infusoria, a term often applied to actively motile Protozoa, from the fact that they appear in infusions of animal or vegetable matter. They were formerly believed to be spontaneously generated in such infusions; but it is now known that they are present in dust, etc., on the substances of which the infusion has been made. The term is an old one, and has almost dropped out of strict zoological nomenclature; but it is a convenient general name for Protozoa which move by cilia or by flagella. It may then be said to include the three following orders—(1) Ciliata, forms like *Paramecium*, which possess numerous cilia; (2) Flagellata, those like *Nocti-*

luca, which possess few large flagella; and (3) Suctorina, or Acinetaria, in which the cilia are converted into suctorial tentacles.



Infusoria.

1. *Paramecium aurelia*. 2. *Noctiluca miliaris*.
3. *Acinetia livadiana*.

Infusorial Earth. See KIESELGUHR.

Ingelov, JEAN (1820–97), English poetess and novelist, born at Boston, Lincolnshire. Her first acknowledged volume of *Poems* appeared in 1863. Less popular was a *Story of Doom* (1867), though some of its miscellaneous lyrics—especially in the section ‘Songs of the Birds’—are exquisite. A third volume of *Poems* appeared in 1885. The author’s best work is in her first volume, *The High Tide on the Coast of Lincolnshire, 1571* (1863), has the truth of life and the charm of romance; *Supper at the Mill* is a bright picture, dainty with songs; *Divided, Persephone, Scholar and Carpenter*, have all high and individual merits. The three series of *Poems* were published in one volume (1898). As a novelist Miss Ingelov gained attention with *Off the Skelligs* (1872), and reached her highest expression in *Fated to be Free* (1875). See *Jeann Ingelov and her Early Friends* (1901).

Ingemann, BERNHARD SEVERIN (1789–1862), Danish author, born at Thorkildstrup, island of Falster, and taught at the academy at Sorø (1822–62). Of his earlier works—all of them of an ultra-romantic character—the best is the dramatized fairy tale, *Reinold Underbarnet* (1815). His epic poem *Valdemar den Store* (1824), and his historical romances *Valdemar Sejer* (1826), *Erik Menveds Barndom* (1828), and others, made a sensation in their day and awoke the national feeling; but to an Englishman they seem pale reflections of Sir Walter Scott with the humour left out. Perhaps his best works are his rustic tales, *Landsby-børnene* (1852), and his hymns, especially *Morgen og Aftensange* (1839). His *Samlede Skrifter* appeared in 1843–64. See *Schwanenflügel’s Ingemanns Liv* (1886), and *Petersen’s Mindeskrift over B. S. Ingemann* (1889).

Ingermanland. See INGRIA.

Ingersoll, tn., Oxford co., Ontario, Canada, 19 m. N.E. of London; has manufactures of iron castings, agricultural im-

plements, furniture, and woollens. Pop. (1901) 4,573.

Ingersoll, ROBERT GREEN (1833–99), American lawyer, lecturer, and politician, a native of Dresden, New York. He became a republican campaign orator, but his attacks on the Christian religion and the Bible hindered his political advancement. Among his published lectures may be noted *The Bible; The Gods, and other Lectures* (1876); *Some Mistakes of Moses* (1879); *Great Speeches* (1887); and *Foundations of Faith*. His *Works* were published in 12 vols. in 1900. See *Life* by Handford (1899).

Ingleby, CLEMENT MANSFIELD (1823–96), English Shakespearean scholar and philosophical writer, born at Edgbaston, Birmingham. His chief books were *The Shakespeare Fabrications* (1859), *A Complete View of the Shakespeare Controversy* (1861), *Shakespeare Hermeneutics* (1875), *Centurie of Prayer* (1875; 2nd ed. 1879), *Shakespeare’s Bones* (1882), *Essays* (1888), and an edition of *Cymbeline* (1886).

Inglis, JOHN, LORD GLENCORSE (1810–91), lord justice-general of Scotland, born in Edinburgh. In 1835 he was called to the Scottish bar, and in 1852 he was made solicitor-general, an office he changed three months later for that of lord advocate. In 1858 he became lord justice-clerk, and on the death of Lord Colonsay in 1867 was appointed lord president and lord justice-general of Scotland. He published a *Historical Study of Law* (1863). See *Life* by Watt (1893).

Ingoldsby, SIR RICHARD (d. 1685), English regicide, was born at Lenthenborough, Buckinghamshire. On Richard Cromwell’s resignation he entered into negotiations with the agents of Charles II. Although distrusted, he was sent in 1660 by Charles to suppress the rising organized by John Lambert, whom he captured at Daventry. For this service he received a full pardon.

Ingoldsby Legends. See BARHAM.

Ingolstadt, fortified tn. of Bavaria, Germany, stands on l. bk. of the Danube, 52 m. by rail N. of Munich. From 1472 to 1800 it was the seat of a university (transferred to Landshut, 1800, and to Munich, 1826). The Gothic church of Our Lady has monuments to Eck (theologian), Tilly (who died here in 1632), and others. There are two castles, formerly residences of the dukes of Bavaria—Ingolstadt, and a Jesuit college (1555). Beer and gunpowder are made, and cannon are cast. Pop. (1900) 22,207.

Ingraham, JOSEPH HOLT (1809–60), American religious writer, born at Portland, Maine; was first a sailor, then a teacher, but finally became a clergyman of

the American Episcopal Church (1855). He is best known by his popular religious stories for the young, such as *The Prince of the House of David* (1855), *The Pillar of Fire* (1859), and *The Throne of David* (1860). His earlier works, *The South-west* (1836), *Captain Kyd*, and *The Dancing Feather*, were also successful.

Ingrain Colours are those formed in the actual fibre of the material, either by the union of a dyestuff with a mordant already placed there, or by decomposing a soluble compound which has been soaked into the fibres into an insoluble one that must remain. Such colours are thus well protected, and are particularly fast to washing.

Ingram, ARTHUR FOLEY WINNINGTON (1858), bishop of London, was born at Ribbesford in Worcestershire. In 1889 he became head of Oxford House, Bethnal Green, London, and laboured in the East End for the best part of nine years, during the last three of which he also filled the rectory of Bethnal Green; and much of the present success of the University Settlement in that poor and crowded area is due to his personal influence and efforts. A feature of his ministry in the East End was his public discussions in Victoria Park with socialists and atheists. In 1897 he was appointed bishop of Stepney (suffragan bishop of London), and four years later he became ecclesiastical head of the see.

Ingram, HERBERT (1811–60), the founder of illustrated journals in England, was born at Boston, Lincolnshire. It was in London that, on May 14, 1842, he produced, along with Nathaniel Cooke, the first number of the *Illustrated London News*. He became associated, though only as an innocent dupe, with the fraudulent company schemes of Mr. John Sadleir, M.P. He was drowned while on a tour in America.

Ingram, JOHN KELLS (1823), born in Co. Donegal, Ireland; became professor of English literature (1852) at Trinity College, Dublin, and in 1866 regius professor of Greek. He has given much attention to political economy, his contributions to that subject having excited much attention in the United Kingdom and on the continent of Europe. His chief works are *History of Political Economy* (1888), *History of Slavery and Serfdom* (1895), *Present Position and Prospects of Political Economy* (1878), *Work and the Workman* (1880), *Outlines of the History of Religion* (1900), *Human Nature and Morals according to Comte* (1901), etc.

Ingres, JEAN AUGUSTE DOMINIQUE (1780-1867), French historical painter, the great leader of the classical school as opposed to the romanticists under Delacroix, was born at Montauban. In 1825 he opened an *atelier* for students in Paris, painted one of the ceilings in the Louvre, and was director of the French school at Rome (1834-41). He eventually settled in Paris. His first paintings are in Rome and in the Louvre. They include such works as *Virgil Reading the Eneid* (1812), the *Odalisque* (1839), the *Apotheosis of Homer* (1827), the *Fountain* (1848), *Venus Anadyomene*, and numerous portraits of celebrities. See Ch. Blanc's *Ingres, sa Vie et ses Ouvrages* (1870).

Ingulph, or **INGULF** (d. 1109). After having gone on pilgrimage to Jerusalem, he entered the monastery of St. Wandrille in Normandy, and became prior. In 1086 he was appointed abbot of Crowland, and died there while holding the office of secretary to the Conqueror. The *Chronicle of Crowland*, attributed to Ingulph, is now considered a forgery.

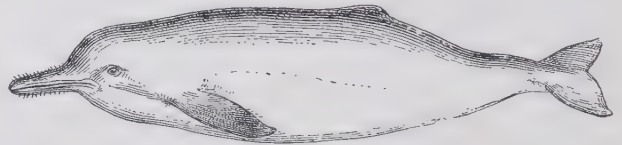
Inhalation, in medical practice, is the application of remedial agents to the respiratory organs, generally by the inbreathing of medicaments dissolved in hot water. Inhalation may be soothing, stimulating, antiseptic or antispasmodic, according to the drug used and the effect desired.

Inhabbance. (1.) District of Portuguese E. Africa, with coconut palm, sugar-cane, and rubber plantations. Coffee of fine flavour grows wild. Native pop. 300,000. (2.) Seaport town of above dist. Pop. about 3,300.

Inheritance. The rules regulating the descent of land—i.e. estates of inheritance, in case of persons dying intestate after 1833—are contained in the Inheritance Act, 1833, and sec. 19 of the Law of Property Amendment Act, 1859. Before this act descent was traced from the person last seized. (See Blackstone, vol. ii. ch. 4.) The rules are as follows:—(1.) Descent is traced from the last 'purchaser'—i.e. the last person who acquired the land otherwise than by descent. (2.) Land descends lineally to issue *ad infinitum*, males being preferred to females. (3.) Of two or more males of the same degree of consanguinity, the elder and his issue take exclusively, but females take together as co-parceners. (4.) On failure of issue the inheritance goes to the nearest lineal paternal ancestor and his issue, if the ancestor is dead. (5.) On failure of paternal ancestors and their issue, the maternal ancestors and their issue succeed. (6.) On admission of maternal ancestors, the mother of the most

remote male paternal ancestor and her heirs are preferred, and the same rule applies to female maternal ancestors. (7.) The whole blood is preferred to the half blood. (8.) On total failure of the heirs of the purchaser, the inheritance descends as if the person last entitled had been the purchaser. By the Land Transfer Act, 1897, real estate on the death of the person entitled after Jan. 1, 1898, notwithstanding any devise, devolves on his personal representative as trustee for those beneficially entitled. See also HEIR and SUCCESSION; also Williams's *Law of Real Property* (19th ed. 1901).

Inhibition is the term applied to the sentence by which a clergyman is forbidden to perform the duties of his office. It is one of the means of enforcing obedience to an ecclesiastical decree. See PUBLIC WORSHIP REGULATION ACT.



Inia, or fresh-water Dolphin of the Amazons.

Inia, the generic name of a curious fresh-water dolphin, *Inia geoffroyensis*, which occurs in the upper streams of the Amazons R. It has a long cylindrical beak furnished with scattered hairs, reaches a length of seven feet, and has a mere rudiment of a dorsal fin.

Initials, in law, when intended to represent the name, are a sufficient signature to satisfy a statute which requires a document to be signed—such, for example, as the Statute of Frauds and the Wills Act in England. In Scotland initials are a sufficient signature of a deed, if proved to be genuine and accustom. In England a deed is executed by being sealed and delivered, and does not require signature. Most mercantile documents are sufficiently authenticated by initials; but in the case of bills of exchange, which are the creation of custom, and where it is of great importance that a clear title should appear on the face of the instrument, it is at least desirable that the name should be signed.

Initiative, a political institution in Switzerland by virtue of which the people are entitled to compel their elected representatives to consider either a certain subject (with a view to framing a law) or a bill dealing with a certain subject. In short, it is the right of petition, coupled

with the right of legally forcing that petition to be taken into consideration, and it practically amounts to direct legislation by the people. It is (since 1869) the complement of the referendum, and in some sort its converse. In the cantons with a *Landsgemeinde* (a purely democratic assembly, wherein all citizens appear in person) a single citizen enjoys the right of initiative—e.g. in Uri, Unterwalden, Glarus, and the Inner Rhodes of Appenzell—but seventy in the Outer Rhodes. The number of petitioners required varies elsewhere from 1,000 to 12,000 (Bern). All the Swiss cantons have now adopted this institution (Bern in 1893 only), save Lucerne, Freiburg, and Valais. In the federal constitution it was only adopted in 1891, and then in an imperfect form in the case of a partial revision of the constitution, when 50,000 citizens have the right of

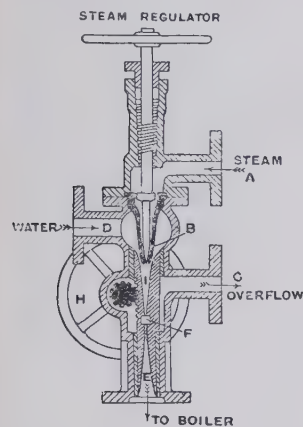
initiative. See S. Deploige's *The Referendum in Switzerland* (Eng. trans. ed. by Miss Tomm, 1898), especially pp. 189, et seq.; J. M. Vincent's *Government in Switzerland* (1900), pp. 84-90, 195; H. Stüssli's *Referendum und Initiative in den Schweizerkantonen* (1893).

Injectons, in medicine, are therapeutic or nutrient agents introduced into the cavities or into the tissues of the body by means of mechanical contrivances such as syringes. Of the body cavities into which injections may be introduced, the rectum is the most important. (See ENEMA.) Other cavities to which injections are applicable are the nose, the larynx, the auditory canal, the urethra, the bladder, the vagina, the uterus, and the stomach. Antiseptics and anesthetics, such as cocaine, are the drugs which are chiefly used in injections for these cavities or channels; but in many cases simple warm water, or warm water with a little sodium bicarbonate, is employed to remove foreign bodies, inspissated mucus, or plugs of wax. In using injections for such purposes, gentleness is essential in the introduction of both the nozzle and the fluid. A douche-can, which may be raised or lowered, is generally preferable to a syringe, as the pressure is regulated by the height of the can, and if necessary the fluid can be withdrawn

by placing the can at a lower level than the patient.

Within the last few years a most important class of injections has been employed for the prevention or for the cure of certain diseases which, like diphtheria, are caused by micro-organisms or their products. (See SERUM THERAPY AND HYPODERMIC INJECTION.) For post-mortem injections, see ANATOMICAL PREPARATIONS.

Injector. The injector is an instrument by means of which water can be forced into a boiler against the pressure of the steam. It was invented by Giffard in 1858, and is worked by a jet of steam, which returns to the boiler along with the water injected. The figure shows a section of an injector similar to that first invented by Giffard. Steam enters



Giffard's Injector.

from the boiler at A, and passes through an annular orifice B, the size of the opening being regulated by screwing the central cone in or out. At B the steam meets the feed-water, which enters through the pipe D. The cold feed-water condenses the steam, and, in consequence of the partial vacuum thus formed, the water rushes in with a high velocity, and passes down the combining cone I, being assisted by the impact of the steam behind it. In passing along the expanding part of the nozzle, the velocity of the water is reduced, and in consequence its pressure is increased. Hence the water forces its way into the boiler through a non-return valve (not shown in the figure), which prevents its return when the injector stops. The lower end of the combining nozzle I communicates, through an opening at F, with the overflow G, and provides a way of escape at starting for the steam and water, till

the pressure at E is sufficient to enable the water to lift the non-return valve and pass into the boiler. A hand-wheel H regulates the size of the water orifice by sliding the cones I and E up or down, parallel to the axis of the injector. Instead of using steam from the boiler, the injector is sometimes worked with the exhaust steam from the engine, the steam orifice being then made larger.

Injunction, in English law, is an order of the court requiring a party to abstain from doing a wrongful act, or to do a rightful one. Injunctions may be mandatory, ordering a party to do something; or restrictive, requiring him to refrain from doing something. An injunction is generally in the first instance interlocutory—i.e. it is granted till the trial, in order that the position of parties may not be altered in the meantime. If the right is established, the injunction is made perpetual. An injunction is also granted in many cases of contract where damages do not give sufficient relief. A person disobeying an injunction may be committed for contempt of court. See also INTERDICT.

Inkerman, tn. of the Crimea, Taurida gov., S. Russia, 3½ m. E. of Sebastopol. The rock of Inkerman is honeycombed with troglodytic dwellings, passages, etc., and the stone is in great request for building. The battle of Inkerman, in which the Russians were defeated by the British and French armies, was fought on Nov. 5, 1854.

Inks and Stains. Staining, as distinguished from true dyeing, may be sufficiently defined as the saturation of a porous material with a colouring solution, without there being such chemical union as to prevent the subsequent dissolving out of the colour by the use of the original solvent. Nevertheless, in many instances, staining, as ordinarily practised, is very similar to true mordant dyeing. Writing-inks are of the nature of stains, but require the presence of a little gum to reduce the absorption and to moderate the flow from the pen; a stain that is not viscous of itself, such as the solution of a coal-tar colour, requires about twenty grains of gum to the ounce.

Besides the stains that can be prepared by using the soluble aniline colours in the proportion of ten to thirty grains to the ounce, the following are some of the most effective:—

Red.—The old carmine red stain or ink is one of the brightest reds, but it is rather fugitive when exposed to light. Water, 5 oz.; carmine, 50 grains; strong ammonia, 1½ oz. Put in a bottle

and shake occasionally until dissolved. Brazil-wood red stain or ink:—Half a pound of Brazil-wood chips; water, 2½ pints; alum, 1 oz. Put in an earthenware jar, and heat this in a saucepan containing water which is kept boiling. Stir occasionally with a wooden stick; when cold, add half a pint of strong acetic acid, or 4 oz. of glacial acetic acid. If intended for use as an ink, add gum as directed. Ordinary red ink is a solution of eosin in water.

Orange and Yellow.—A simple decoction of turmeric, two ounces to a pint, is excellent as a yellow—an ounce of vinegar to a pint (or a drachm of glacial acetic acid) tending to keep the colour bright. If orange is wished for, make the decoction of double strength, and add a dozen drops of the Brazil-wood stain to each ounce.

Green.—Sap green (extract of buckthorn berries) is dissolved in water in the proportion of about two ounces to a pint. No gum is required when used as an ink.

Blue.—The alkali salts of indigo disulphonic acid (sold as indigo carmine), in the proportion of half an ounce to a pint of water, is more permanent against light than the aniline dyes; but when used as an ink, it requires, as they do, the addition of gum.

Black.—A typical black stain or ink is the ordinary iron and galls ink. Well-crushed galls, 1 lb.; soft water, 12 pints. Heat to boiling, and add ½ lb. of green vitriol (commercial ferrous sulphate). Put into a bottle and shake daily for a few weeks. Add 6 oz. of gum, and strain.

A copying-ink requires to be somewhat soluble on rewetting, and is increased in body and kept on the surface of the paper usually by the addition of sugar, dextrin, etc.

Indian ink is extremely fine lamp-black, either moulded into a cake by the aid of glue and rubbed up for use with water, or suspended in a weak gum or resinous solution. It is called indelible ink, as it is not destroyed by exposure to atmospheric influences or chemicals, and is waterproof if suspended in a weak solution of shellac dissolved in borax solution.

Secret or invisible inks are solutions which, when spread on paper, are invisible, but which appear when heated or treated with reagents. Cobalt chloride forms a solution of the first kind, becoming blue when heated; whilst a weak infusion of galls is an example of the second kind, as writing made with it becomes black if treated with ferrous sulphate solution.

Marking-ink.—Silver nitrate, 180 grains; water, 1½ oz. Dis-

solve, and add as much strong ammonia solution, drop by drop, as will redissolve the precipitate first formed. Now add $\frac{1}{2}$ oz. of gum mucilage, and a little sap green in order that the writing may be visible. The black colour is developed by exposing the article to light, or by ironing with a moderately hot iron.

Ink for india-rubber stamps.—Aniline violet of the more soluble kind is rubbed in a mortar with its own weight of water, after which from four to five times its weight of glycerin is added.

Printing-inks of the ordinary kind consist of a pigment ground up in a suitable mill with boiled linseed oil or varnish, lamp-black being used for the usual black ink. No definite receipt would be useful, as these inks are made up to special qualities to suit various papers and speeds of machine running, those for fine hand-press work being stiffest and richest in pigment. Dried and powdered soap, added in the proportion of an ounce to each four pounds of ink, facilitates the separation of the paper from the type.

Inland Revenue. See **REVENUE**.

Inland Sea, the 240 m. of Japanese water between Hondo on the N. and Shikoku and Kiu-shiu on the S. Shimoneseki Strait forms the W. outlet, Naruta Passage and Akashi Strait lead to the Pacific, and Bungo Channel opens to the S. between Kiu-shiu and Shikoku.

Inlaying is generally understood as limited to wood, the art of embossing other substances in pieces being called mosaic. It is therefore identical with marquetry, which consists in the fitting together of pieces of differently coloured wood so as to form patterns. These are cut from thin panels or veneers by means of the fret-saw. Inlaying has always a solid background, and is supposed to be like a picture; marquetry, on the other hand, has no background, but is all pattern. Venetian marquetry is made from one piece of wood, the pattern being outlined with a penknife, and the cut filled in with black wax; the pieces are then dyed to the requisite colours. The object of the wax is to prevent the dyes from spreading. Mander's dyes are specially adapted to this work.

Inman, WILLIAM (1825-81), founder of the Inman line of steamships, was born at Leicester, England. He became a partner (1849) in the firm of Richardson Brothers, Liverpool, and managed their fleet of sailing-vessels, then trading between Liverpool and Philadelphia. In 1857 he founded the Liverpool, New York,

and Philadelphia Steamship Company, generally known as the Inman Line.

Inn. See **HOTEL** and **INN-KEEPER**.

Inn, river of Austria and Germany, rises in the Alps, in the Swiss canton of Grisons (Engadine), and flows for 320 m. in a general north-easterly direction through Tyrol and Bavaria, and enters the Danube at Passau.

Inner House. See **COURT OF SESSION**.

Innerleithen, tn., Peebles-shire, Scotland, on river Leithen, $\frac{1}{2}$ m. E. of Peebles; has woollen manufactures. Its medicinal

Ages (1860). See *Memoir* by his daughter, Mrs. Hill Burton (1874).

Innes, THOMAS (1662-1744), Scottish antiquary, was born at Drumgask, Aberdeenshire. He carried on researches at the Scots College in Paris, of which he was vice-principal (1727-44), and at Edinburgh. His *Life* by Grub is prefixed to his *History of Scotland* (1879). His chief works were his *Critical Essay on the Ancient Inhabitants of the Northern Parts of Britain* (1729), and his *Civil and Ecclesiastical History of Scotland* (1853).

Innkeeper. By common law both in England and Scotland an



Inlaying.

Escritoire à toilette, in tulip wood inlaid with various other woods, formerly belonging to Marie Antoinette. By David Roentgen, 1780. (S. Kensington Museum, Jones collection.)

spring is supposed to be the 'St. Ronan's Well' of Sir Walter Scott. Pop. (1901) 2,181.

Innes, COSMO (1798-1874), Scottish antiquarian, born at Durris, on Deeside. Admitted to the Scottish bar in 1822, he was employed in several important peerage cases; was appointed sheriff of Moray (1840), and, in 1846, professor of constitutional law at Edinburgh. He edited a large number of the register books of the religious houses of Scotland for the Maitland, Spalding, and Bannatyne Club; and he wrote *Sketches of Early Scotch History* (1861); *Scotland in the Middle*

innkeeper is bound at a reasonable price to afford food and lodging to, but not to appropriate any particular rooms for, every traveller who offers himself as a guest at any hour of the day or night, provided there is sufficient room for him in the inn, and there is no good reason—e.g. disorderly character or infectious illness—for refusing him. An innkeeper is answerable also at common law for all loss or damage to his guest's property, unless such loss or damage has been occasioned by the act of God, the king's enemies, or by the guest's own negligence; but now, by the

Innkeepers Liability Act, 1863, no innkeeper is liable to make good to a guest a loss or injury to goods or property brought to his inn, not being a horse or other live animal, or any carriage, to a greater amount than thirty pounds, except (1) where the goods are stolen, lost, or injured by his wilful act or default, or by that of his servant; or (2) where the goods or property have been deposited expressly for safe custody. An innkeeper is bound to accept the custody of such goods, and must exhibit a copy of this provision in a conspicuous part of the inn to entitle him to the protection of the act. An innkeeper is also bound to take

fection. By the Game Act, 1831, an innkeeper may not be a licensed dealer in game; and by the Inland Revenue Duties Act, 1869, he does not require a licence for his male servants. An innkeeper can be called upon to provide billets for soldiers and their horses, and to furnish rations, as laid down in the Army Act. See LICENCE.

Innocent, the name of several Popes.—**INNOCENT I.**, a native of Albano, who became Pope in 402, vigorously enforced the celibacy of the clergy and the supremacy of the Roman see; died in 417, and was canonized. — **INNOCENT III.** (Lotario de' Conti, 1161–1216), born at Anagni, succeeded Celestine III. in 1198. Under his rule the

Pignatelli, 1615–1700), born at Naples, and elected Pope in 1692; reversed the policy of Innocent XI. to some extent, and was reconciled to Louis XIV. See *Brischar's Papst Innocentz III. und seine Zeit* (1883); Jorry's *Histoire du Pape Innocent III.* (1855); B. Labanca's *Innocenzo III.* (1892); Serdonati's *Vita e fatti d'Innocenza VIII.* (1829); M. Immich's *Papst Innocentz XI.* (1900).

Innominate Artery, one of the large arteries rising from the arch of the aorta. It is the largest branch arising from the transverse portion of the arch, and divides into the right common carotid artery and the right subclavian, just behind the articu-



Innsbruck, the capital of the Austrian Tyrol.

in luggage, unless it is of an exceptional character—e.g. tigers or dynamite (per Lord Esher). An innkeeper has a lien on all the property brought by a guest to the inn, although not really his, until the debt in respect of his lodging and food has been satisfied. By the Innkeepers Act, 1878 (it is doubtful whether this act applies to Scotland), he is further entitled to realize his lien by public auction after he has held the goods for six weeks, and a month's notice of the sale has been given by advertisement as required by the act. By the Public Health Act, 1875, an innkeeper must, under a penalty of £20, disinfect his house after in-

papal power reached its highest point. He excommunicated the kings of France and Spain, and laid both countries under interdict. He also forced John of England to yield the right of investiture. He was equally zealous for reform within the church. — **INNOCENT VIII.** (Giovanni Battista Cibo, 1432–92), of Greek extraction, a licentious man, elected in 1484 by improper means, who became so deep in debt that he had to pledge the papal tiara. — **INNOCENT XI.** (Benedetto Odescalchi, 1611–89), born at Como, elected Pope 1676; quarrelled with Louis XIV., and elicited the famous 'declarations of the Gallic clergy.' — **INNOCENT XII.** (Antonio

lacion of the right clavicle with the sternum at its upper edge.

Innsbruck, chief tn. in the Austrian prov. of Tyrol, is beautifully situated at the foot of the Alps, in the Inn valley, and at the N. end of the great Alpine road (now railway) across the Brenner Pass into Italy. It is adorned with fine public monuments—e.g. the Leopoldsbrunnen (1893), Rudolfsbrunnen (1863–77), Annasäule (1706), triumphal arch (1765), and statue of Hofer (1893) on Berg Isel. But all these are eclipsed by the colossal marble sarcophagus erected, between 1509 and 1593, in the Franciscan church (16th century) to the memory of the Emperor Maxi-

milian I. The chief public buildings are the Ferdinandeum or Tyrolese museum (1842), the imperial castle (1766-70), and the Ambras castle. Innsbruck has a university, founded in 1672, and attended by upwards of a thousand students. At the suburb of Wilten there is a factory for staining glass and making mosaic. Pop. (1900) 27,056; or including the suburbs, over 53,000.

Inns of Court. The four inns of court—the Inner Temple, Middle Temple, Lincoln's Inn, and Gray's Inn—alone have the right to admit law students and call them to the English bar. Each of them is a separate society with separate property, and is governed by a 'bench' of co-opted members. The inns of court must be distinguished from serjeants' inns (see SERJEANTS), the property of the last of which has been sold and the society dissolved; and from the inns of chancery, two of which were attached to each inn of court. Originally a barrister served an apprenticeship in an inn of chancery before he joined an inn of court. In Ireland the King's Inns in Dublin provide for calls to the Irish bar much as in England. See BARRISTER; also Loftus's *The Inns of Court* (1905).

Innuendo, in an action for defamation, is the interpretation put by the plaintiff in his statement of claim on the alleged libel—for example, 'The defendant said, "We all know how honest an attorney A is,"' meaning thereby that the plaintiff is a dishonest attorney.

Inoculation is the intentional or accidental introduction of certain products of disease into the body through the skin or mucous membrane. In man the chief diseases transmitted by inoculation are vaccinia, smallpox, anthrax, syphilis, and hydrophobia. Long before Jenner's day inoculation with smallpox virus was practised. Pasteur's treatment for hydrophobia is based on a similar principle, as are also the various serum injections for diseases. Sir T. R. Fraser and Calmett have recently got good results by injecting serum containing anti-venin for the production of immunity to snake bite. The operation of inoculation may be performed by injecting the morbid material into the subcutaneous or submucous tissue, or by applying the contagia to a raw surface produced by scarification or by blistering. Accidental inoculation may be produced by the bite of an animal (insects are of importance in this connection), or by the contact of a specific virus with any abrasion or wound on the skin or mucous membrane.

Inosite, $C_6H_6(OH)_6$, is a crystalline solid resembling sugar that is found widely distributed in the animal and vegetable organism.

Inowrazlaw, tn., Prussian prov. Posen, 23 m. by rail s.w. of Thorn; produces salt, and has saline springs. Pop. (1900) 26,141.

In partibus infidelium—i.e. in the regions of unbelievers. Bishops *in partibus*—i.e. ruling in places where the Roman hierarchy is not established—are usually titular. They bear the names of lapsed dioceses. There are many such in the East. The crusading armies annexed to the Roman Church many Mohammedan lands, which were again lost to the church when they retired. As Rome never acknowledges defeat, the titles of those sees were retained, and granted to bishops employed in other parts of the world in which missionary work could be carried on. The Roman bishops in England were titular from the reformation to 1850. The Roman hierarchy was then reintroduced into England, and later into Scotland. See ROMAN CATHOLIC CHURCH.

Inquest. See CORONER.

Inquisition, a tribunal established by the Roman Catholic Church in the middle ages for the detection and punishment of heresy. It was also known as the Holy Office. Its origin may be traced to the crusade against the Albigenses. It was under Popes Gregory IX. (1232) and Innocent IV. (1248) that this special tribunal, directly dependent on the Pope himself, was created, under the direction of the Dominican order, which had all the animus against heresy which its founder had displayed in the Albigensian persecution. This new institution was soon introduced into Spain, Italy, and Germany. It never obtained a foothold in Northern France or an entry into England. In most countries it was regarded with jealousy by the civil power, which had all the opprobrium of executing the sentences. The Spanish Inquisition at first differed in no wise from the comparatively innocuous institution elsewhere; but it was reorganized (1478) to make it more efficient against the Jews, who were alleged to be plotting against the government. In spite of the protests of Pope Sixtus IV., the right of appointing inquisitors, and apparently of directing the operations of the tribunal, was reserved to the Spanish crown, and from this date Catholic historians disclaim all responsibility for its operations. But the church at least tolerated it: the tribunal continued to judge in matters of faith; the inquisitors were churchmen, and the infamous Torque-

mada was a Dominican. It is charged against this inquisitor that he condemned 9,000 persons during his tenure of office. The Spanish Inquisition fulfilled its most perfect work in the Spanish American colonies; and after Portugal fell into the hands of Spain, in the Portuguese colonies also.

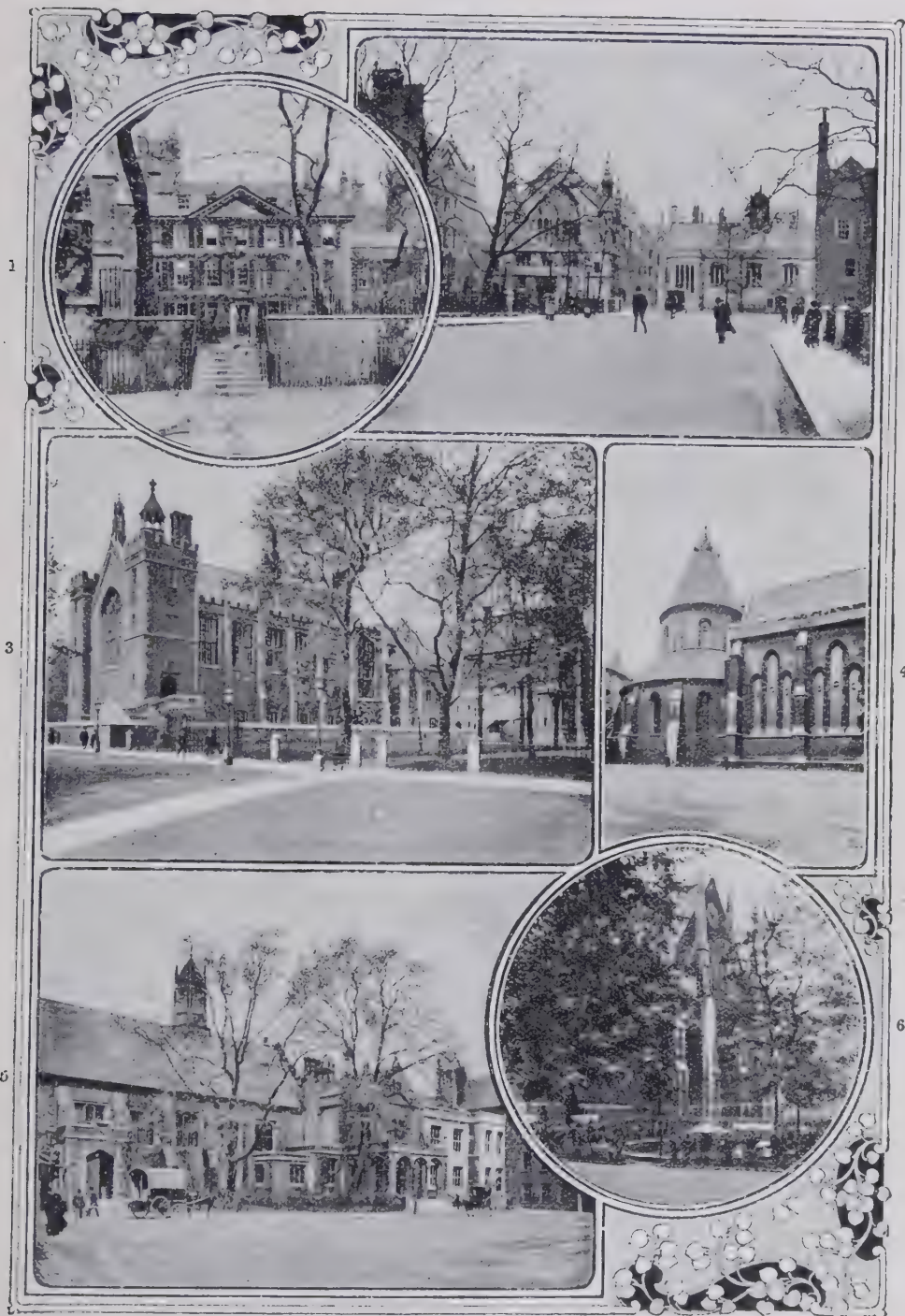
The ceremonial *auto-da-fé* (act of faith), at which the sentences of the Inquisition court were read, was usually held on a Sunday between Trinity and Advent, and those convicted of heresy were formally handed over to the state for torture or execution. The first recorded was in 1481 and the last in 1813. Gradually the vigour of the Inquisition was relaxed as the religious passions of the period died down, but it was not till 1835 that it was finally abolished. The Inquisition as the Holy Office still exists, but its function is confined to the detection of heresy in books. See Lea's *Hist. of the Inquisition* (3 vols. 1888); Llorrente's *Hist. of the Inquisition in Spain* (Eng. trans. 1826).

Insanity, or disorder of the mental function, is a symptom of many morbid changes in the brain, which is the organ of the mind. There can be no disorder of the mind without disorder of the brain, although many brain diseases do not produce insanity. It is only when those parts of the brain are involved which are associated with its highest or mental functions that insanity results. In the great majority of cases of insanity the mind as a whole is deranged, the intellectual faculties, the will, the feelings, and organic appetites being all, though often unequally, involved.

SYMPTOMS.—The symptoms of insanity may be considered under (1) general mental disturbance, (2) change in will-power, (3) alteration of feelings and instincts, and (4) insane habits.

1. Most prominent of these groups is the *general mental disturbance*, which may take the form of (a) depression, (b) exaltation, (c) enfeeblement, or (d) perversion of mind.

Depression.—As a result of morbid brain changes a patient may experience feelings of great distress and unhappiness. The intensity of the feeling varies from slight degrees of melancholia to such hopeless wretchedness that the patient desires to end his life and misery by suicide. In the graver forms of depression delusions are frequent, and they are of a distressing nature. He imagines that poison is put in his food, that people are conspiring against him, and so on. Such mental depression often leads the patient to refuse food, and his delusions may cause him to be homicidal or suicidal, as he may



The Inns of Court.

1. The Master's House, Inner Temple. 2. Lincoln's Inn Chapel and Old Hall. 3. Lincoln's Inn Hall and Library. 4. Temple Church.
5. Gray's Inn Chapel, etc. 6. Fountain Court Temple and Middle Temple Hall.

hear 'voices' commanding him to kill others or himself.

Exaltation.—Morbid activity of the intellectual powers is frequent in the insane. The controlling faculties are impaired, and the patient is extravagant in his speech and behaviour. He talks incessantly, and is noisy, impulsive, often destructive and violent. In the graver forms the patient may be quite oblivious of his surroundings; ordinary sensations, sound, light, heat, and pain elicit no response; he shouts, sings, and runs riot from one subject to another without apparent connection or external stimulation. Delusions are common, but are more apt to be pleasant than those associated with depression. Thus in exaltation a patient frequently imagines that he is possessed of boundless wealth, great position, or supernatural powers. Along with mental exaltation there is often exaggeration of the appetites.

Enfeeblement.—Intellectual enfeeblement is manifested in stupidity, loss or impairment of memory, incoherence, inattention to surroundings, and lack of energy. The degree of enfeeblement varies from slight childishness of manner and speech to profound dementia, in which all the mental faculties are in abeyance. In most cases the will power is weak and the feelings are dulled.

Perversion of the mental faculties may exist apart from marked depression, exaltation, or enfeeblement, and is displayed in the wrong conceptions which a patient forms about himself or his environment. On account of his diseased mental action the patient becomes the subject of delusions or false beliefs. In some cases patients labour under delusions upon one subject or upon one set of subjects, and are apparently insane only to that extent. Such patients are called monomaniacs, and they generally exhibit one of three types of delusion: (1) of grandeur, (2) of suspicion, and (3) of unseen agency. The more fixed a delusion is, the worse is the prognosis. Hallucinations, too, are of extreme importance in insanity: a patient's conduct is often influenced by them, and patients frequently follow the guidance of imaginary voices.

2. Condition of the Will.—Another set of symptoms is associated with the condition of the will and the power of self-control, which are generally weakened in the insane. The unsound in mind are often the creatures of impulse, and are liable to fits of irritability or anger produced by petty causes which would not disturb the equanimity of a well-balanced

individual. Such patients are apt to become the slaves of vicious habits, such as drunkenness; and as persistent indulgence in alcohol still further weakens the will, there is a tendency for the patient to become more and more a slave to his passions as time goes on. As a result of some brain lesions the lack of self-control is displayed by the emotional instability of the patient, who is moved by trifles to laughter or to tears.

3. Changes in the Feelings and Instincts.—As a result of brain disorder the natural appetite for food may disappear, or become so perverted that the patient eats and drinks filthy substances. The inborn love of life may be replaced by a desire for death that induces the patient to attempt suicide, while the natural feelings of love may be so distorted that he seeks to destroy his nearest and dearest. Similarly the sexual instinct may be lost or depraved, and the patient may indulge in indecent or immodest speech and action.

4. Insane Habits.—As a result of these various disturbances certain insane habits are formed. The patient may be inattentive to the calls of nature; he may be dirty or destructive from stupidity, carelessness, or mischievous design. He may dress fantastically, or hoard up useless and rubbishy articles as if they were of value, or he may squander his money under a delusion of grandeur.

Along with purely mental symptoms insanity presents certain marked bodily changes. The skin is generally dry, the tongue is often coated, and constipation is usual. Sleeplessness, loss of appetite, refusal of food, and vicious habits, such as alcoholism, bring in their train further depression of the general health.

VARIETIES.—The more common forms are described in separate articles (see MELANCHOLIA, etc.); but in considering the whole field of insanity, a summary of the leading types is necessary for the purposes of comparison. (1.) Congenital imbecility and idiocy exist from birth or from infancy, and they may be considered as arrests of development. The term imbecility is applied to the slighter degrees, while idiocy is reserved for those which are more marked. These conditions often depend on coarse lesions of the brain or its membranes: thus hydrocephalic children are generally imbecile or idiotic. (2.) Melancholia has depression as its most prominent feature, and in grave cases delusions of a distressing nature are present. (3.) Mania, on the other hand, is chiefly characterized by unnatural exaltation, which varies with the severity of the attack.

Delusions are often present. (4.) Dementia is characterized by mental weakness similar to that of imbecility, from which dementia is to be distinguished by the fact that the demented patient has degenerated from a healthy state of mind. Dementia is apt to follow any chronic form of insanity. (5.) General paralysis is a distinct disease, which some are inclined to attribute to a toxic origin. Certainly many cases are associated with syphilis. Usually the first noticeable mental symptoms are grandiose delusions, which are accompanied by a gradual loss of the power of co-ordinated movement. Paralysis in this disease begins in the muscles of phonation, and gradually extends to those of the whole body. The power of swallowing is impaired, and the patient loses control over the bowel and the bladder. Nutrition is seriously affected, and the bones become brittle and liable to fracture, while bedsores are apt to form in the badly nourished tissues. Most cases end fatally in about two years, but the disease is sometimes arrested, and some patients live for many years in the paralytic stage. (6.) Epileptic insanity is in the first place usually associated with attacks of maniacal excitement occurring either before or after the fits. Hallucinations are common, and sometimes as *auræ* (warnings) herald the approach of a fit. After a prolonged history of epilepsy the brain tissues suffer, and the patient often dies demented.

PATHOLOGICAL CHANGES.—In the more chronic forms of insanity the brain cells are diminished in size and number, and they are distorted in shape, while their communicating processes are broken and interrupted. As nerve cells atrophy their place is taken by an overgrowth (sclerosis) of the connecting tissue. To this overgrowth the atrophy of the true nerve elements was at one time attributed, but it is now known that the formation of new connective tissue is an effect instead of the cause of the nerve-cell atrophy.

PROGNOSIS.—The chances of recovery from insanity depend upon many factors:—(1.) *Duration of illness.* If a year elapses without appreciable amelioration, the outlook is unfavourable, especially if delusions or hallucinations remain fixed at the end of that time. Melancholia is an exception, however, and patients may recover from this condition after it has existed for long periods. Merely passing or accidental causes produce much less intractable insanity than chronic alcoholism or long-continued epilepsy. (2.) *Heredity.*

In hereditary insanity the prognosis is often favourable, but relapses are to be feared, and with each relapse the patient's prospects of sound mental health diminish. (3.) *Degree*. The more acute the mental and bodily symptoms the better is the prospect of recovery if the case be recent. Marked sleeplessness, acute mania, loss of appetite, and diminished bodily secretions are less to be feared than insanities in which the patient sleeps and eats well, or has persistent delusions and changed moral character. (4.) *Age*. As a rule, youth predisposes to recovery. The more elderly patients often recover from melancholia, but their outlook is very unfavourable when mania with delusions or moral perversion characterizes their disorder. Such cases often terminate in dementia. (5.) *Periodicity*. Any approach to circularity, and even exacerbations and remissions on alternate days, are unfavourable to recovery.

TREATMENT.—In the great majority of cases of insanity removal of the patient to an asylum is the first and most important part of the treatment. When the mental disorder is caused or aggravated by physical causes, general hygienic measures should be adopted. Thus anæmia may have to be treated; constipation and sleeplessness must be overcome; and a plentiful supply of good food and fresh air are frequently of more importance than drugs. Exercise suited to the patient's strength and condition serves in many cases to divert nervous energy from the disordered centres. Massage or passive exercise may also be employed with benefit, especially in those cases where it is desirable to economize the patient's strength. Of medicines, narcotics and sedatives, such as chloral, bromides, hyoscyamus, cannabis indica, and in some cases opium, are of service in controlling excitement and inducing sleep. Occasionally recourse must be had to mechanical means of restraint, such as a long-sleeved jacket, or a pack, in which the patient is swathed, mummy fashion, in bedclothes, with only his head exposed. Apart from sedatives, the drugs most likely to benefit patients suffering from insanity are tonic preparations of iron, such as Easton's syrup; foods, such as cod-liver oil and malt extract; and mineral acids and purgatives. For insanity in its legal aspect, see LUNACY AND THE LUNACY LAWS.

Inscribed Stock is stock which is not issued in the form of a bond passing from hand to hand, with coupons for dividend attached, but is *inscribed*, along with the name of the holder, in

a register kept by the government or corporation issuing it. It is also known, for the same reason, as *registered stock*. Holders of such stock receive certificates showing that they are registered as holding stock to a given amount, and are entitled to a stated amount of interest. In many cases they have the option of receiving either certificates of this kind without coupons, or bonds to bearer, with coupons for dividend attached.

Inscriptions are records cut, engraved, or moulded on stone, metal, wood, clay seals, or other similar material, as distinguished from literary records, which are written with ink or other colouring matter on substances such as papyrus, parchment, or paper. The term 'inscriptions' is particularly applied to records of the kind described which have come down from antiquity.

Inscriptions are the sole authorities for some periods of history; and for all are perhaps the best, as giving in most cases, though not necessarily, a contemporaneous account of the events which they describe, and that an account given often by the actors themselves. But it must not be forgotten that fiction is as possible on stone as on paper, and that it often suited a monarch to represent his actions in anything but a true light. Yet inscriptions, when contemporaneous with the actions they record, may always be trusted at least to illustrate the manners and ideas of the time; and in regard to philological questions, they give an irrefragable testimony to the language, its forms, and its spelling at any particular epoch. Even here, however, allowance has occasionally to be made for the errors of uneducated workmen.

Inscriptions have been found in almost every part of the world which has attained any degree of civilization—in Egypt, Babylonia and Assyria, Greece, Italy and all the Roman empire, Britain, India, and America.

Egyptian Inscriptions.—Almost all the ancient monuments of Egypt bear inscribed records, written mostly in a character known as the hieroglyphic. The oldest is an ivory plaque, bearing the name of King Mena, dating about 4700 B.C. One of the most interesting inscriptions is known as the Rosetta stone, which contains an inscription in three versions—in hieroglyphic, in hieratic, and in Greek—and which afforded the clue to the decipherment of the hieroglyphic character. More information will be found under EGYPT AND HIEROGLYPHS.

Babylonian and Assyrian.—Many inscriptions have been

found in these lands, beginning with Layard's discoveries about the middle of the 19th century; and more recent discoveries, particularly those of the American Exploration Fund, have unearthed whole libraries of inscribed bricks of clay. The character used is the cuneiform, which was interpreted by means of the great Persian inscription at Behistun, set up by Darius I. about 520 B.C., and written in three versions—Persian, proto-Medic, and cuneiform. The laws of Khammurabi (reigned about 2200 B.C.), tablets of contracts, accounts, even books of all sorts, the records of kings such as Sargon, Tiglath-pileser, Assurbanipal, and Nebuchadnezzar, are most interesting. See Rawlinson and Norris's *Cuneiform Inscriptions of Western Asia* (1861-70); J. P. Peter's *Nippur* (1897).

Semitic.—Many inscriptions in the Phœnician character have been found—one a bronze vessel of the reign of Hiram, about 1000 B.C., now in the Bibliothèque Nationale at Paris; and the Moabite stone, recording the events of the reign of Mesha, king of Moab, about 890 B.C., including his war with Ahab. Many others come from Cyprus and from Palmyra. See the *Corpus Inscriptionum Semiticarum* (1881, etc.), and Schröder's *Die Phœnizische Sprache* (1869).

Cretan.—The recent discoveries at Cnossus, Phæstos, and other ancient sites in Crete have brought to light inscriptions in Cretan characters distinct from the Phœnician and Greek; they have not as yet been interpreted. They date roughly about 1500 B.C. See the *Journal of the British School at Athens* (1900, etc.).

Greek.—The oldest inscriptions come from the island of Thera, dating perhaps as early as 900 B.C. A famous one is cut on the knee of one of the colossi at Abu-Simbel in Nubia by Greek mercenaries in the service of the Egyptian king; its date is about 600 B.C. Greek inscriptions include laws and treaties, lists of the fallen in battle, private epitaphs, contracts, tribute lists, and indeed every kind of official and private record. See Beek's *Corpus Inscriptionum Græcarum* (1877), Kirchhoff's *Corpus Inscriptionum Atticarum* (1873-95), Roberts's *Introduction to Greek Epigraphy* (1887), Hicks's *Manual of Greek Historical Inscriptions* (1882), and Dittenberger's *Sylloge Inscriptionum Græcarum* (1898).

Latin.—Of Latin inscriptions the oldest date about 300 B.C.; that on the tomb of the Scipios is famous. They are marked by a special style, with many conventionalisms and abbreviations. One of the most useful

historically is the great inscription composed by Augustus, and known as the *Monumentum Ancyranum*, the sole remaining copy having been found at Ancyra in Galatia; it has both a Latin and a Greek version, but neither is complete. There are also a number of inscriptions in other Italic dialects. See the *Corpus Inscriptionum Latinarum* (1863, etc.); Egbert's *Introduction to the Study of Latin Inscriptions* (1896); Fabretti's *Corpus Inscriptionum Italicarum* (1867-80); Schneider's *Dialectorum Italicarum Exempla* (1886).

Indian.—Indian inscriptions are numerous; the oldest are the edicts of Asoka, a Buddhist king who reigned about 300 B.C. There are seventeen versions of them, two on pillars at Delhi and Allahabad. See Cunningham's *Corpus Inscriptionum Indicarum* (1877).

Runic.—Inscriptions in this character exist in Sweden, Norway, Denmark, England, the Isle of Man, and elsewhere. One of the 1st century A.D. is at Trondhjem in Norway; one at Collingham in Yorkshire commemorates the death of King Oswin, murdered in 650 A.D.; another on the cross of Ruthwell, near Dumfries, contains part of Cædmon's poem on the crucifixion. See G. Stephens's *The Old-Northern Runic Monuments of Scandinavia and England* (1866-84; new ed. 1901), and his *Handbook of Old-Northern Runic Monuments* (1884).

American.—Runic inscriptions have been found in Greenland, the work of early Scandinavian settlers; there are many native inscriptions, in a sort of picture writing, in the ruined cities of Yucatan, Honduras, Mexico, and Guatemala, which have not as yet been deciphered.

Insecticides. in horticultural practice, must be fatal to insect pests, yet not injurious to plants. The use of tobacco smoke has been described under FUMIGATION. A solution of soft soap, one ounce to a gallon of water, is also often efficacious as a wash for the leaves affected. Tobacco steeped in hot water, four ounces to the gallon, and tobacco powder applied in the dry state, make effective insecticides. Gishurst compound, eight ounces to the gallon of water, is also a good application. Mr. Quin recommends that insects and mildews injurious to the leaves of fruit-trees be kept in subjection or destroyed by a free use of the following combination of lime and sulphur: Take of quick or unslaked lime four parts, and of common flowers of sulphur one part; break up the lime into small pieces; then mix the sulphur with it in an iron vessel, and pour on them enough boiling water to slake the lime

to a powder; cover in the vessel close as soon as the water is poured on. This makes also a most excellent whitewash for orchard trees, and is very useful as a preventive of blight on pear trees, to cover the wounds in the form of a paste when cutting away diseased parts, also for coating the trees in April. This should be used quite fresh, as it soon loses its potency. The preparation should be sprinkled over the young plant as soon as, or before, any trouble from aphides, thrips, or mildew occurs, early in the morning, while the dew is on the trees. It destroys pests by giving off gaseous sulphurous compounds, which poison minute living forms, whether animal or fungoid. Lime also destroys these organisms by contact, and is not injurious to vegetable life except when applied in excess. There are many other compositions used as insecticides. Among these are Paris green, an arsenical compound; Bordeaux mixture, a sulphate-of-copper compound largely used in agriculture; emulsions of soap and petroleum, etc. See also under INSECT POWDER.

Insectivora, or INSECT-EATERS, a name applied to an order of mammals whose members are mostly nocturnal, are of small size, and feed upon insects and other small creatures. The order is not very well defined, but its members may be recognized by the combination of the following characters. There are usually five toes on each foot, each toe bears a claw, and neither thumb nor great toe is opposable. The animals walk usually on the sole of the foot, or are plantigrade. There are never less than two pairs of incisor teeth in each jaw, and the innermost pair is often the largest; the cheek teeth are furnished with small cusps, used in cutting through the hard coats of the insects upon which the animals feed. In the skeleton complete collar bones are present. The brain shows a relatively low degree of organization, and the body is clothed externally with soft fur, or, as in the hedgehog, with spines and hair.

Insectivores are absent from S. America, where their place in nature is taken by the marsupial opossums, and also from Australia. Their nearest allies are the bats, which are specialized insectivores. It is on account of their relationship to lemurs that insectivores are always placed high in a linear classification of mammals. They probably arose from a marsupial stock.

Very different from all other insectivores is the Malayan flying mammal known as *Galeopterus*, and it is in consequence sharply separated from the other forms.

Insectivorous Plants, a collective name for plants that entrap insects and other small animals, feeding on the captures by a process of true digestion, or absorbing the results of decomposition. John ('Coralline') Ellis received examples of Venus's fly-trap (*Dionaea muscipula*) from Dr. Garden, and in 1768 sent a description of the plant and its habits to Linnaeus. This, the highest form, belongs to the order Droseraceae. It is a native of the peat bogs of N. Carolina. The halves of the leaf blade are movable on the midrib, and furnished on each margin with teeth. On each half of blade are three sensitive hairs, and the whole surface is thickly set with digestive glands. Immediately an insect touches one of these hairs the blades close, the teeth interlock, the glands exude their digestive juice on the insect, and the products are absorbed. In the native common sundew (*Drosera rotundifolia*) the same result is obtained by means of stalked glands, which also function as tentacles, bending over to secure the prey; and in the butterwort (*Pinguicula vulgaris*) the margins of the leaf are the agents of capture, while the digestive juice is excreted by stalked and sessile glands on the leaf blade. *Aldrovandia vesiculosa*, an aquatic plant from southern and central Europe, has leaves which function like those of Venus's fly-trap. *Drosophyllum lusitanicum*, a native of Portugal and N.W. Africa, has stalked glands as well as sessile, but they do not bend over to confine prey. Their viscid secretion acts as a digestive ferment as well as a means of capture. Bladderwort (*Utricularia vulgaris*) is common in lakes and pools, especially in the district of the Norfolk Broads. The traps or bladders are modified leaf organs, and present a general resemblance to the commonest prey—waterfleas (*Daphnia* and *Cypripis*). The trap is entered by a door, which opens inwards, but not outwards, so that escape is impossible. In the *Journal* of the Quekett Microscopical Club (April 1903, p. 484) is a note from Mr. Green of the Peradeniya Botanic Gardens, to the effect that on several occasions he had seen young fish about an inch long 'caught and firmly held by their tails in these little traps.' The products of decomposition are absorbed by the cross-shaped cells lining the inner surface of the bladder. In the pitcher plants compound leaves are modified into pitcher-like receptacles, sometimes with a lid. The attractions for insects are bright colours, and glands secreting nectar. Beneath the sweet bait is a slippery surface, affording inse-

cure foothold, and insects pitching thereon fall into the secretion at the bottom. In the Old World genera *Nepenthes* and *Cephalotus* there appears to be a true digestive process; in the group of which the American genus *Sarracenia* is the type only the products of decomposition are absorbed; and in the genus *Dischidia*, from India and Australia,

alyzes the motor centres of insects, whereby they are stupefied and rendered motionless. Dalmatian powder is the most effective; it contains about 1.25 per cent. of a volatile oil, and a small quantity of pyrethrotic acid, which is the toxic principle. Good insect powder should stupefy common house-flies kept near it within a minute. See INSECTICIDES.

Insects are defined by the possession of the following characters. The segmented body is divided into three regions—*viz.* the head, thorax, and abdomen. The first bears a pair of antennæ in addition to the appendages round the mouth; the thorax bears three pairs of legs, and frequently two pairs of wings in addition; the abdomen is without true jointed legs, though it may possess what appear to be modified appendages. Breathing is effected by tubular tracheæ, opening to the exterior by means of apertures called stigmata. Not infrequently there is a metamorphosis in development, the larvæ being then very unlike the adults. As in arthropods in general, the body is clothed with chitin, and the true appendages are jointed.

External Appearance.—The head is of much functional importance, in that it bears the chief sense organs, and contains the most important of the nerve centres; anatomically it is in the higher forms sharply separated off from the rest of the body, while in certain of the lowest forms the distinction is much less obvious. Though the head does not show any signs of segmentation, the fact that it is made up of at least four segments is apparent from the presence of four pairs of appendages; it is indeed probable that no less than six segments are fused together in it. The chitinous investment, though not segmented, is nevertheless made up of several pieces connected by delicate membrane. The most important of these are the clypeus, an anterior piece which bears the flaplike labrum or upper lip; and the epicranium, which forms the great part of the roof of the head.

The head always bears a pair of antennæ, which are delicate sense organs, very freely movable, and varying greatly in size and appearance. The other three pairs of cephalic appendages are placed round the mouth. In the majority of insects they consist, first, of a pair of mandibles, which are hard-toothed organs, reaching a great size in certain beetles. Behind the mandibles come the paired maxillæ, which consist usually of a basal piece divided into two segments, a slender jointed palp, and an inner branch divided into two. The third pair of mouth appendages is constituted by the labium, formed by the union of the members of the pair in the middle line. The union usually involves only the basal portion, which constitutes the mentum or chin, closing the mouth below. As in the maxillæ, there are palps at the sides, here called the labial palps. In suctorial insects,



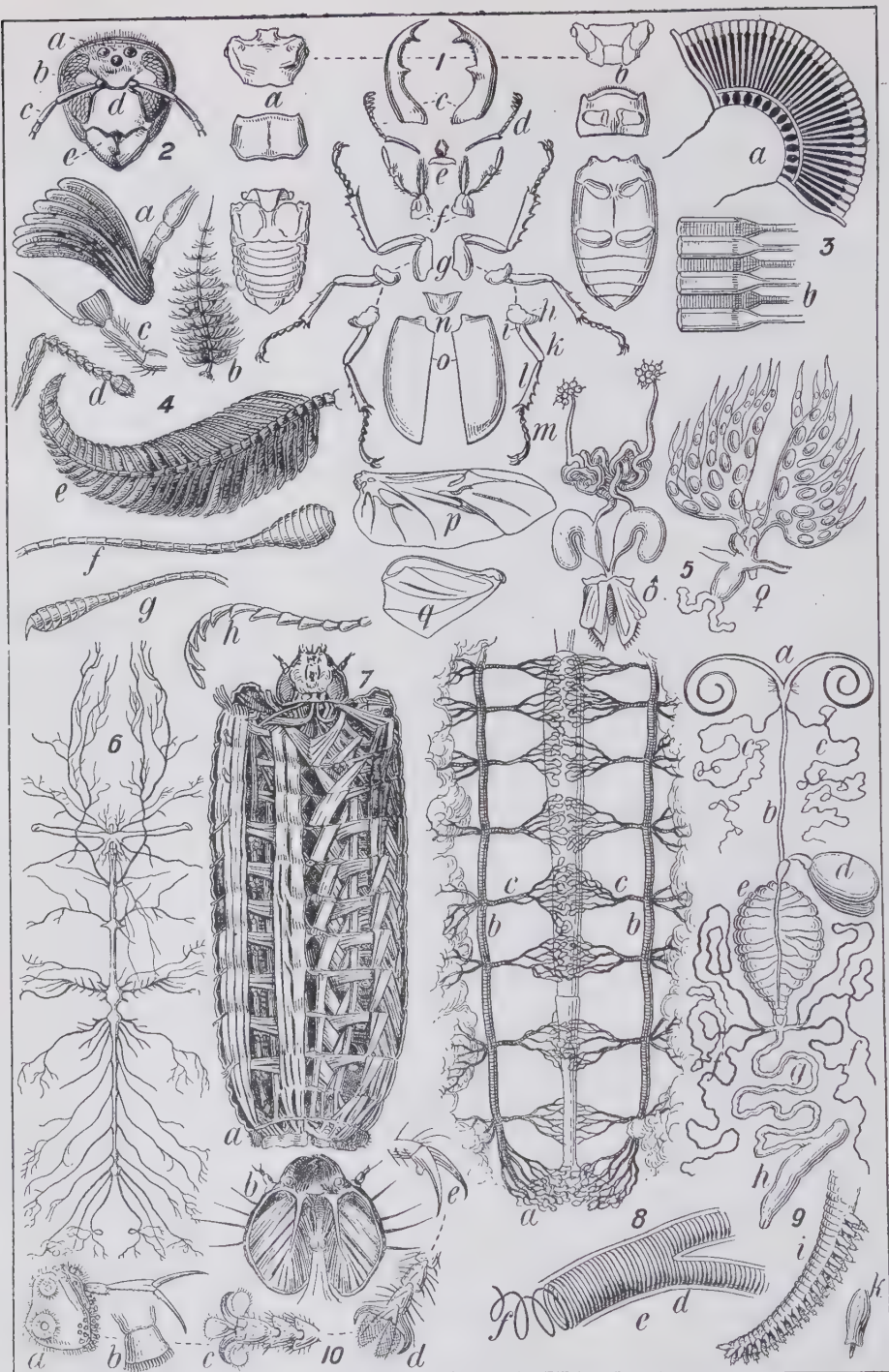
Insectivorous Plants.

1. *Drosera rotundifolia*. 2. *Pinguicula vulgaris*. 3. *Drosera rotundifolia*. 4. *Aldrovandia vesiculosa*. 5. *Utricularia vulgaris*. 6. *Dionaea muscipula*. 7. *Sarracenia Drummondii*. 8. *Nepenthes rafflesiana*. 9. *Dischidia rafflesiana*. 10. *Cephalotus follicularis*.

pitchers store water for use by the plant. Over twenty species of pitcher-plants are grown in Britain, and the flowers are removed to promote the formation of the pitchers.

Insect Powder is a yellowish-green, coarse powder, obtained by grinding the flower-heads of *Chrysanthemum cineræfolium*. It has a pungent odour and acrid taste, and is non-poisonous to higher animals, but quickly par-

Insects, which constitute the class Insecta, are by far the most abundant of land animals. Not a few live during at least a part of their life in fresh water. The members of a genus of bugs (*Halo-* *bates*) inhabit the sea, but the typical home of the class is earth or air, and it is as terrestrial forms that they attain vast abundance. Not only are the species enormously numerous, but the reproduction of the individual is rapid.



Insects: Structure.

1. Parts of a Beetle (*Lucanus cervus*): a, b, head, thorax, abdomen (upper and under side respectively); c, mandibles; d, antennae; e, libbium, with palpi attached; f, maxillae, with palpi attached; g, legs; h, coxa; i, trochanter; k, femur; l, tibia; m, tarsus; n, scutellum; o, elytra; p, wing, open; q, wing, folded. 2. Head (*Vespa crabro*): a, ocelli; b, compound eyes; c, antennae; d, scutellum; e, mandibles. 3. Eye (*Melolontha vulgaris*): a, section; b, some of the lenses on larger scale. 4. Antenna: a, cockchafer; b, gnat (male); c, *Tachina grossa*; d, weevil; e, ermine moth; f, fritillary; g, skipper; h, cardinal beetle. 5. Reproductive organs (*Athalia centifolia*), male and female. 6. Nervous system (*Lucania cerulea*). 7. Muscular system (larva of *Cosmus ligniperda*): a, general view; b, head to show muscles which move the jaws. 8. Respiratory system (larva of *Cosmus ligniperda*): a, proboscis (divided); b, oesophagus; d, a single tube on larger scale; e, membranous covering; f, spiral thread. 9. Alimentary system (butterfly): a, proboscis (divided); b, oesophagus; c, salivary vessels; d, crop; e, stomach; f, hepatic vessels; g, small intestine; h, large intestine; i, tip of proboscis to show papillae; k, single papilla on larger scale. 10. Feet: a, *Acilius* (male); b, caterpillar (abdominal foot); c, *Asilus*; d, dung fly; e, flea.

such as flies, these parts are greatly modified, so that the identifications are difficult. In addition to the jointed appendages, the head of insects bears compound eyes, and not infrequently simple eyes in addition.

The thorax is composed of three segments, each of which is composed of several elements—e.g. the tergum or dorsal region, the ventral bar or sternum, and the side pieces or pleura. The degree of development of the three thoracic regions varies greatly—the first, or prothorax, especially often presenting remarkable modifications of form; the other two (mesothorax and metathorax) are more or less controlled in variation by the mechanical necessities associated with the fact that they bear the wings. Each of the thoracic segments bears a pair of legs, these legs having the following structure:—Each is connected to the body by a segment called the coxa; then follow trochanter, femur, tibia, and tarsus in this order. The tarsus consists of several pieces, five being regarded as the typical number. At its extremity there are usually claws and often pads, the use of both being to give firm foothold, and to enable the animals to walk on perpendicular surfaces.

The wings are outgrowths of the integument, and consist of two layers, between which lie tracheæ. Certain thickened lines in the wing constitute the so-called nervures, which have considerable systematic importance. Typically insects have two pairs of wings, but, as in lice and fleas, these may be both absent. In flies (Diptera) the anterior wings are only represented by little knobs called halteres or balancers; in beetles (Coleoptera) the anterior wings are converted into wing covers, and are of no use in flight; in moths and butterflies (Lepidoptera), in bees and wasps (Hymenoptera), and several other insect orders, the wings are similar, and both pairs are used in flight. The variations in the shape and structure of the wings are of great importance in classification.

The third region of the body, or the abdomen, is distinctly segmented, and consists of a variable number of segments, the maximum being apparently eleven. Appendages are typically absent; but not infrequently, as in the common cockroach, there may be little styles called cerci, which are believed to represent appendages. Other structures, such as saws, stings, ovipositors, and so on, often found at the extremity of the abdomen, are by some authors also regarded as modified appendages.

Internal Anatomy.—The nervous system of insects is of the ordinary arthropod type—i.e. there are a dorsal brain, a ring round the gullet, and a ventral chain; but in the higher forms especially there is much fusion of ganglia, and the brain becomes very complex. As in most arthropods, the eyes are compound, consisting of a large number of eye elements compacted together. The antennæ are primarily organs of touch, but often bear a number of delicate sense organs whose function it is difficult to determine. In locusts, crickets, and their allies (Orthoptera), organs described as auditory occur either on the front legs or at the base of the abdomen.

The muscular system is well developed, the muscles being striped, and structurally like those of vertebrates. It is often stated that the muscular force exerted by insects is greater in relation to the bulk of the body than that of vertebrates, but this has not been definitely established.

In regard to the alimentary system, we find that salivary glands are usually present, pouring their secretion into the mouth; the mouth opens into the œsophagus or gullet, and this into a crop, which again opens into the gizzard, only present in some insects, and this into the true stomach, which often has blind diverticula called pyloric cæca connected with it. At the junction of stomach and intestine are fine tubes—Malpighian tubes—which constitute the excretory organs. The intestine varies in length in different insects, and opens to the exterior by a terminal anus. Of this alimentary canal, only the true stomach (also called chylic ventricle) is lined by endoderm, and it is in it that digestion and absorption take place.

The respiratory system is very perfectly organized. It consists essentially of a series of tubes ramifying throughout the body, and opening to the exterior by orifices called stigmata. The tubes are the tracheæ; they are lined with chitin, and are strengthened internally by a spiral thread. The tracheal capillaries supply every organ and every region of the body, so that by this means oxygen is carried direct to the tissues without the intervention of the blood. It is, however, uncertain how the carbon dioxide produced in respiration is got rid of, some entomologists being disinclined, on several grounds, to believe that this is expired through the stigmata.

The blood in insects has no respiratory significance, and is purely a nutritive fluid. The so-

called heart, or dorsal vessel, is a delicate tube with several lateral openings, and is continued forwards into a narrower vessel called the aorta. Other vessels apparently do not exist. The 'heart' is chambered and contractile, and lies beneath the dorsal body wall. Around it is an ill-defined space, the pericardium, which usually contains a number of fat-cells, forming part of the fat-body, a mass of reserve material which is very conspicuous in some larvae.

As regards reproductive organs, the sexes are separate; and in many insects, in addition to males and females there are neuters, usually modified females, which do not reproduce, though they may have important functions to perform in social life. The ovary is in the form of tubes, which may be very numerous, as in the queen termite, or may be single. Paired oviducts are present, usually uniting posteriorly; and there are frequently accessory organs and glands, as well as external hard parts, such as stings and ovipositors. In the male there are a pair of testes, with coiled vasa deferentia, and usually expanded seminal vesicles. Copulatory organs of some kind are usually present externally.

Life History.—Insects reproduce rapidly, each generation being relatively short-lived, but the life history is often complex. Only a few characteristic life histories can be noticed here. In the 'straight-winged' or orthopterous insects, such as locusts, grasshoppers, cockroaches, and so on, the young leave the egg-case in the form of miniature adults, save that they are without wings. These young grow, moult or cast their coats, and by successive moults acquire the wings of the adult. On the other hand, the egg laid by the butterfly hatches, not a miniature adult, but a larva which differs from the adult not only in the absence of wings, but in the shape of the body, the structure of the mouth parts, the length of the antennæ, the mode of life, and the internal structure. In this case the caterpillar, when full fed, becomes a passive pupa, and within the pupa case the organs of the body break down, and are reconstructed to form those of the adult or imago. This is complete metamorphosis, defined chiefly by the fact that a period of complete quiescence intervenes between larval and adult life. In dragon-flies the difference between the aquatic larvae and the winged aerial adults is also great; but no quiescent pupal stage occurs, and the metamorphosis is thus described as incomplete.

Classification.—In classifying insects, the characters on which most reliance can be placed are the nature of the wings and the characters of the mouth appendages. Following Dr. Sharp (Cambridge Natural History Series), we recognize only nine orders, which are as follows:—(1.) Aptera, primitive wingless insects, which have no metamorphosis in development. Examples, *Campodea* and *Lepisma* ('silver-fish'). (2.) Orthoptera, the straight-winged insects, which have four wings, the anterior pair being more or less leathery, and smaller than the hind pair; there is no metamorphosis in development. Examples, locusts, grasshoppers, cockroaches. (3.) Neuroptera, insects with four similar wings with numerous nervures; the degree of metamorphosis varies. Examples, dragon-flies, May-flies, caddis-flies. (4.) Hymenoptera, insects with four membranous wings, the fore larger than the hind; metamorphosis complete. Examples, ants, bees, wasps, saw-flies. (5.) Coleoptera, insects in which the anterior wings are converted into elytra or wing-covers, concealing the membranous hind wings; the metamorphosis is complete. All beetles belong to this order. (6.) Lepidoptera, insects having all four wings covered with scales; the metamorphosis is complete, and the adults differ from the preceding insects in having a suctorial mouth. The order is made up by the butterflies and moths. (7.) Diptera, insects with only two wings, and with a suctorial mouth; the metamorphosis is complete. All flies in the true sense belong to this order. (8.) Thysanoptera, minute insects with four narrow fringed wings. Example, thrips. (9.) Hemiptera, insects with the anterior pair of wings more or less modified, mouth suctorial; metamorphosis incomplete or absent. Examples, bugs, cicadas, aphides.

Apart from the useful products, such as silk, honey, cochineal, etc., obtained from the insect world, insects are of importance as fertilizers of flowers, and in many cases as scavengers. Negatively, their significance as the foes of agriculture can hardly be overestimated; while medical men are just beginning to realize their importance as agents in the dissemination of disease. (See MOSQUITOES.) Another great series help, however, to make the earth habitable by preying upon their plant-destroying fellows, and a vast number of terrestrial vertebrates depend in whole or in part upon the insect world for food. The frequent splendour of colour, the numerous protective adaptations, the differences between the sexes, have given rise

to many discussions in connection with the Darwinian theory of colour. (See COLOUR, MIMICRY.) The instincts evinced by the highly specialized forms, whether social or solitary, have great psychological importance. (See ANT, BEES, WASP.) The mutual relations between flowers and the insects which fertilize them is a matter of great interest; and in this connection such books as Sir John Lubbock's *British Wild Flowers in Relation to Insects* (Nature Series, 1882) and Kerner's *Natural History of Plants* (trans. by Oliver, 1902) should be consulted.

References.—A fascinating general account, with many references, will be found in Dr. D. Sharp's *Insects* (2 vols., in Cambridge Natural History Series, reprinted 1901). Some idea of the wealth of British species may be obtained from J. G. Wood's *Insects at Home* (1883); while the same author published a companion volume as *Insects Abroad* (1874). For detailed accounts of insect anatomy, B. Thompson Lowe's *Anatomy... of the Blow-fly* (1893) and Miall and Denny's *Cockroach* (1886) should be consulted. Mention should also be made of the following: A. S. Packard's *Text-book of Entomology* (1898), a standard work; Lubbock's *Origin and Metamorphoses of Insects* (Nature Series, 1883); L. C. Miall's *Natural History of Aquatic Insects* (1903); and Selous's *The Romance of Insect Life* (1905).

INSECTS AFFECTING FARM CROPS.—Destructive insects are most conveniently treated under the classes of crops which they injure.

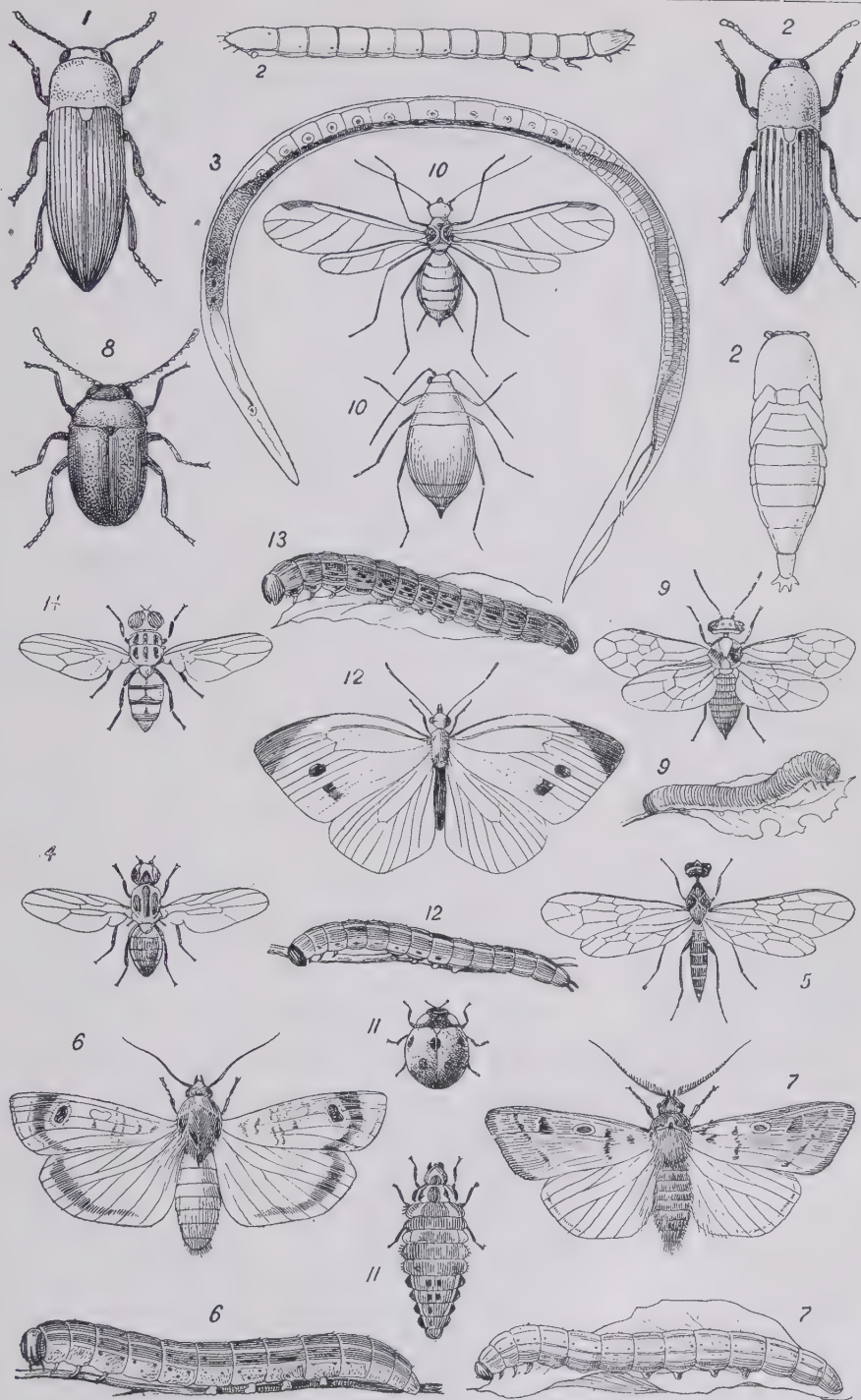
Insects which attack Corn Crops.—Wireworms are the larval form of click-beetles or skip-jacks, known scientifically as *Elaeter* (*Agriotes*) *lineatus*, *obscurus*, *sputator*, and *ruficaudis*, of which the two first are the best known. These are hard, yellow, jointed, sluggish, smooth and glossy grubs, with black or brown heads, and furnished with six true legs at the anterior portion of the body. They are said to remain five years in the larval or grub condition before they become perfect in form, during the whole of which time they are mischievous. Wireworms also attack grass, roots, potatoes, and all kinds of crops, as well as corn. They burrow through the ground, passing from root to root. Early in the spring their ravages are easily seen from the yellow and dying condition of corn plants. The best remedy is to heavily roll repeatedly, or top-dress with 1½ cwt. of nitrate of soda and 5 cwt. of salt. Among various other suggestions that have been

offered are the following: (1) autumn ploughing and exposure of the turned furrow to the rigours of frost; (2) heavy rolling of growing crops; (3) liming; (4) feeding root crops upon the ground with sheep; (5) dressing with rape cake; (6) ploughing in white mustard in the green state; (7) encouraging rooks and other birds; (8) encouraging (or not too rigorously destroying) moles; (9) paring and burning old lairs of grass; (10) trapping by means of slices of potato as bait; (11) good farming in the form of judicious cultivation and liberal manuring.

The stem eel-worm (*Tylenchus devastatrix*), although not an insect, is peculiarly destructive to oats, causing tulip-root or sedging. This nematode worm is of microscopic size, and is closely related to *Tylenchus tritici*, which causes a malformation known as ear-cockle or 'purples.' *Devastatrix* attacks the stem, and, under a low magnifying power, may easily be detected in the enlarged part, which gives the name of tulip-root. The appearance of an affected crop is best described as stunted (hence sedging). There is no healthy growth, and the first impression is that the crop has been attacked by rabbits.

The gout-fly, or ribbon-footed corn-fly (*Chlorops teniopus*), affects wheat, barley, and rye, and attacks them at the stage when the corn is about to ear. The symptom is an enlarged and constricted condition of the ear and sheath, and the head fails to burst through the sheathing. It is caused by the maggot of a small dipterous fly about one-eighth of an inch in length. The maggot is of yellowish-white colour, and passes into a reddish or ochre-coloured chrysalis. Early sowing is a preventive.

The wheat-midge (*Cecidomyia tritici*) is one of the most common causes of loss to the wheat grower. It is allied to the *C. devastatrix*, or Hessian fly, an insect which rarely visits Britain. The wheat-midge is very small and midgelike. It may be readily seen hovering over the crop when wheat is in ear, and is of orange colour, with black eyes. The eggs are deposited within the chaff scales; the maggots are of orange or reddish colour. They suck the juices of the soft grain, and produce a shrivelled and small kernel, much of which blows out in winnowing. The annual losses from this pest are very great, especially in late seasons, when ripening is delayed. There is no cure that can be generally applied, but it is advisable to burn the infected chaff. Some of the remedies suggested are impracticable, such as smoking



Common Insect Pests.

1. Elater (*Agriotes*) obscurus. 2. *E. lineatus*. 3. *Tylenchus devastatrix*. 4. *Chlorops taniopus*. 5. *Cephys pygmaeus*. 6. *Noctua* (*Tryphena*) *promba*. 7. *Agrotis segetum*. 8. *Haltica* (*Phyllotreta*) *nemorum*. 9. *Athalia spinarum*. 10. Greenfly (*Aphis rapae*). 11. *Coccinella septem-punctata*. 12. *Pieris rapae*. 13. *Pieris brassicae*. 14. *Anthomyia betae*.

wheat fields during the time of the insect's incubation.

The maggot of the wheat bulb-fly (*Hylemyia coarctata*) affects the stem just above the root. The corn saw-fly (*Cephus pygmaeus*) deposits its eggs on or near the nodes or knots in the straw. The maggots eat their way through the knots, and thus weaken the straw, which turns prematurely white and falls over.

The wheat eel (*Cecidomyia tritici*) is a nematode worm, which ascends with the sap until it arrives at the ovule. It produces a gall instead of a healthy grain, which is known as 'purples' or 'ear-cockle'; and, on cutting open the tough 'peppercorn,' it will be found full of cottony fibres: these are the eel-worms. They may be seen with the naked eye in a good light.

Insects which attack Root Crops.—Wireworms. See previous section.

Surface grubs are produced from the eggs of the great yellow underwing moth, *Noctua (Tryphena) pronuba*, the dart moth (*Agrotis segetum*), and the *Agrotis exclamationis*. They live underground, and gnaw the young roots, causing bleeding and distortion of form, besides arresting growth. They are best hand-picked. As many as twelve or thirteen are sometimes found at one root.

By far the most destructive insect enemy of the turnip, swede, rape, and cabbage is the flea-beetle or turnip-fly, *Haltica (Phyllotreta) nemorum*, a small, hard-shelled, flea-like insect, gifted with wonderful jumping powers. This insect attacks the young turnips, etc., as soon as they appear above ground, when in first leaf, and often sweeps off the entire crop almost before it appears. Among the indirect methods of preventing or combating attacks, the most effective are careful cultivation and a fine and moist tilth, the liberal use of superphosphate of lime as a manure, and new seed. Among the direct methods of treatment is brush-harrowing or light rolling, in order to raise a dust, which renders the young leaves unpalatable to the fly, and also causes the beetles to hop from the plants and fall to the ground. Drawing a mat or carpet of old sacks moistened with paraffin oil over the affected crop is very effective, and is better than the tarred board on low wheels which has been recommended with the object of trapping the flies.

The turnip saw-fly (*Athalia spinarium*) is the parent form of the black caterpillar, or black jack, nigger, or black palmer, which in some seasons does considerable damage to young turnips

in the second leaf. It is a slug-gish, yellow, four-winged insect, readily marked down and caught. Poultry, lapwings, and other birds are useful in ridding fields of this pest.

The green fly, or turnip Aphis (*Aphis rapae*), generally appears in late summer, and is often very injurious to turnip crops. It congregates on the under sides of the leaves, and sucks the juices, producing a cockled appearance. The removal of affected plants, and washing, are relied upon, but the insect's habit of sheltering underneath the leaf makes it difficult to syringe effectually.

The black doliphia (*Aphis fabae*) is the terror of the bean-grower, and *Aphis humuli* of the hop-grower. Syringing with tobacco water, or with soft soap and paraffin, is effective. The Aphis lion, or larval form of the ladybird (*Coccinella septem-punctata*), is very useful as an exterminator of aphides.

The large and small white butterflies, *Pieris brassicae* and *P. rapae*, are in the larval or caterpillar stage both extremely destructive to cabbages, riddling the leaves, rendering them filthy and unfit for food. The beet-fly (*Anthomyia betae*) lays its eggs on the under side of the young leaves of mangel-wurzels. The caterpillars work between the upper and lower cuticle of the leaf, and form extensive galleries, feeding upon the cellular green matter of the leaf. Insects not only attack growing farm crops, but destroy the wheat, beans, and other stores. Such insects include mites, weevils, beetles, etc. See Curtis's *Farm Insects* (2nd ed. 1883), and E. A. Ormerod's valuable *Manual of Injurious Insects and Methods of Prevention* (2nd ed. 1890), and her numerous *Reports* on injurious insects.

In-shan Mountains, range of S.E. Mongolia, stretching N. of the northern loop of the Hwang-ho to Manchuria, a distance of over 150 m. The natives of the country do not use the name In-shan, but apply their own terms to different parts of the range—e.g. Ta-ching-shan, Wula-shan (w. of Pao-tu), Lang-shan (up to Alashan), etc. The mean altitude of the range exceeds 6,500 ft.

Inssorores, a name sometimes given to the passerine birds.

Insolvency. Prior to the sequestration statutes, which were enacted during the reign of George III., the same severity which marked the English law of bankruptcy was a feature of the Scots law, and the debtor had either to pay his debts in full or go to prison. In Scotland, the condition of a man who cannot pay his debts has always been

known as insolvency. Bankruptcy is insolvency made public in certain ways laid down by statute. The foundation of the existing Scots law of bankruptcy is the Bankruptcy Act, 1856, and under its provisions the most usual method of constituting bankruptcy is by sequestration. The object of sequestration is to collect and distribute the debtor's estate and give him a discharge. Application for sequestration is made either in the Bill Chamber or in the sheriff court, by the debtor himself, with the approval of a creditor, or on the petition of a creditor. The judge awards sequestration, which has the effect of divesting the bankrupt of his estate. A trustee is appointed by the creditors, and confirmed in office by the judge, and the estate of the bankrupt is vested in him to be realized and distributed. After the examination of the bankrupt a composition may be accepted by a majority in number and nine-tenths in value of the creditors. No debtor can be discharged who pays less than five shillings in the pound, unless failure to pay arises from causes for which he is not responsible. Imprisonment for debt is now limited to cases of failure to pay taxes, fines, or penalties due to the crown, rates, assessments, and aliment, the longest term being twelve months in the first of these cases, and six weeks in the last.

Insomnia, or SLEEPLESSNESS. Total insomnia, lasting for several nights in succession, is commonly associated with certain diseases, such as acute mania and delirium tremens. Partial insomnia is manifested in diverse ways. But the victims of insomnia have a natural tendency to magnify the period of wakefulness.

In the treatment of insomnia, drugs should be withheld if possible, as the condition tends strongly to the establishment of a drug habit productive of more harm than sleeplessness. Fresh air, moderate exercise, and freedom from worry and from noise should be secured. The patient ought to take a light meal and a warm bath shortly before going to bed. Sometimes bathing the feet in hot water is effectual. Indigestible food and nerve stimulants, such as tea and coffee, should be avoided, but a small quantity of well-diluted spirit is sometimes conducive to sleep. A hop pillow is often useful, and so is counting. Sedatives and hypnotics are sometimes employed to supplement the more simple measures, but they should never be taken except under medical supervision.

Inspection of Factories. See FACTORIES AND WORKSHOPS.

Inspection of troops. In the British army the general or other officer commanding every command carries out an annual inspection of all battalions of regular infantry serving in his command, which inspection applies both to training and administration. He also inspects all other regular troops in his command yearly, after their technical inspection by the officers mentioned below. His inspection, in their cases, turns chiefly on the administration and interior economy of the corps. The training and instruction of the regular cavalry is tested by an inspection held yearly by the inspector of cavalry. The duty of inspecting the horse and field artillery is divided between the general officer commanding at Woolwich and the general officers commanding the Royal Artillery in the Aldershot and in the southern commands; while the colonel commanding the Royal Artillery at the Curragh inspects the horse and field artillery serving in Ireland. The garrison artillery units in each command are inspected every year by the officer commanding the Royal Artillery in that command previous to the inspection held by the general officer commanding it. Similarly, the officer commanding the Royal Engineers of each command carries out yearly a technical inspection of all engineer troops in that command. In addition, the various commands are visited once a year by the inspector-general of the forces.

As regards the auxiliary forces, infantry units are annually inspected by the colonel commanding the regimental district to which they belong; yeomanry units are inspected yearly by an officer appointed by the general officer commanding the command; auxiliary artillery units, by the officer commanding auxiliary artillery in each command; and auxiliary engineer corps, by the officer commanding the Royal Engineers in the command.

Inspector-general of the Forces, an officer appointed under an Order in Council (Aug. 10, 1904) to perform many of the duties formerly undertaken by the now obsolete commander-in-chief, including the inspection of land defences and of fortifications. He has five assistants for the different branches of the service. The present inspector-general (Nov. 1905) is Field-marshal H.R.H. the Duke of Connaught.

Inspectors of Schools. See SCHOOL INSPECTORS.

Inspiration, a quality attributed to religious writings or utterances whereby they are believed to be of divine origin and author-

ity. The problem of inspiration is presented to the Christian world by the existence of a canon or collection of sacred Scriptures—viz. the Old and New Testaments. Though some would identify the quality with genius, the church has always recognized in Holy Writ something widely different from what is found in Shakespeare, Milton, Bunyan, or even the most impressive books of devotion. For some this inspiration consists in the fact that the Scriptures reveal truths otherwise unknown and unknowable; while others believe that it implies the absolute veracity of every statement made in the Bible—nay, even the unconditional accuracy of every word (*verbal* inspiration). Regarded from such a point of view, however, it becomes a merely intellectual rather than a spiritual quality, and the peculiar property which gained for any particular document its place in the canon is really ignored. It is in the support of such external and intellectual views that the mechanical theories of the origin of inspired writings have been framed. Thus it was believed by some that the Holy Spirit so possessed the minds of the writers that their individuality was for the time annulled. A less objectionable hypothesis is that the Spirit influenced the authors in such a way as to guard them against the statement of error; but even this is vitiated by a suspicion of the mechanical. Generally speaking, we may say that the identification of inspiration with inerrancy results from the obscuration or decadence of spiritual insight, and from the desire for some external and incontrovertible standard, adequate to subdue the minds even of such as do not feel its spiritual authority; it is the view by which the outpourings of the creative mind of the prophet are guaranteed for the later generations by the conservatism of the priest. If inspiration implies inerrancy in every part, then it follows that the Bible in any given language other than the original is not inspired, since no version can claim to represent the autographs with absolute fidelity; moreover, even the received (original) texts must be regarded as similarly deficient, since textual and literary criticism has shown that they exist no longer as they left their authors' hands. And if it be maintained, as a counterplea (as it is by A. A. Hodge, B. B. Warfield, and others), that the (verbal) inspiration belongs only to the autographs, the whole subject passes at once into the air, and we have no inspired Bible at all. It is further manifest that such a theory, put forward professedly in order to make the Holy Spirit

the guarantee of the Scriptures, has a very different result, as it all but implies the infallibility of the church of the first three centuries, since it was the church which ultimately decided whether or not any particular writing was to be admitted into the canon; indeed, the whole tendency of the extreme view is to make the inspiration depend upon the human authors.

It is, however, easier to show what inspiration is not than to say what it is. The Old Testament prophets believed that they spoke under a divine influence, and uttered their message as the word of God. Pre-Christian Judaism extended the idea so as to cover the historical books, and this view generally underlies the New Testament references to the subject (Heb. 3:7; 2 Tim. 3:16; 2 Pet. 1:21), though the first Christians were by no means under the influence of the letter (2 Cor. 3:5-18). The primitive and catholic church placed the New Testament writings on a level with the Old Testament, but at the same time rose to a freer and wider conception of inspiration, placing a sacred tradition side by side with Scripture, as being of no less validity and authority. Luther arrogated to himself considerable liberty in regard to what was of authority in the Bible; he made the value of the Scriptures rest upon Christ, not *vice versa*, and daringly excluded an ethical book like the Epistle of James. The statements of the reformation symbols are conflicting; for example, the Westminster Confession presents a view truly profound and spiritual, while the Helvetic Formula of 1675 adopts a mechanical theory. That God speaks to man in the Bible as in no other book, that the Scriptures enshrine the only authentic records of Jesus Christ, the supreme revelation of God, and embody the purest and highest moral and spiritual teaching known to us or imaginable by us—these characteristics give the book a unique and indefeasible significance; and if they cannot be combined in a scientific hypothesis of inspiration, they form at least the basis of a working theory. See monographs by Lee, Bannerman, Jamieson (Baird Lectures), Sanday (Bampton Lectures); also Briggs's *Whither?* p. 63 ff. (1889); Denney's *Studies in Theology*, ix. (3rd ed. 1895).

Instalment System. The method of obtaining goods by payment in instalments has long been in operation, this kind of trade being principally practised by the 'tallyman.' Articles of dress are the chief goods which he supplies, on the condition that periodical payments are made till

the debt is extinguished. Book canvassers have also found the system a profitable one. More recently the instalment system has been vigorously pushed by the publishers of leading newspapers, notably the *Times* and the *Standard*, who supply a complete set of a dictionary, an encyclopedia, or a 'standard library,' on receipt of a small sum from any person over the age of twenty-one, and the written undertaking of the purchaser to pay a certain number of monthly instalments.

Insterbürg, tn., Prussian prov. of E. Prussia, on river Pregel, 57 m. by rail E. of Königsberg, with an agricultural experimental station, stud farm for horses, linen and machinery factories, iron foundries, tanneries, and breweries. Pop. (1900) 27,787.

Instinct has been variously defined as untaught ability (Bain), inherited capacity for certain complex reactions of the sensorimotor (i.e. cerebral) type (Baldwin, Stout), compound reflex action (Spencer), race-habit (Lamarckian school). From the mental standpoint, instincts may be defined as 'original tendencies of consciousness to express itself in motor terms in response to definite but generally complex stimulations of sense—i.e. they are inherited motor intuitions' (G. Baldwin). The motor aspect is emphasized; motion and sensibility are the two fundamental attributes of reactive living tissue. Well-marked instincts are such as sucking by young animals, pecking of young chickens, nest-building, migration of birds, honeycomb-making of bees, egg-deposition by moths and butterflies. Analysis of such instincts shows certain primary facts common to them all: instinct is congenital by inheritance, not acquired by the individual; it is highly complex, involving both sensation and motion (with their mental correlates as adapted to the species-use of the instinct); though allied to impulse, which is initiated from within the organism (Bain's doctrine of spontaneity), it does not operate until the appropriate stimulus in the environment appears; it involves reflex actions both serially and in co-ordinated groups; in the simplest forms it approximates to simple reflex action; it implies an inherited nervous or other organization adapted to the possible environments in the life-history of the species.

Contrary to pre-evolutional views, instinct has been shown to be not always perfect in working (see Darwin's famous 'eighth chapter' in the *Origin of Species*). For example, the larva of the Sitaris beetle attaches itself indifferently to the bee that enables it to develop, and to any

hairy object of a similar kind. Observations on wasps and other insects show that instincts may be exercised as uselessly and as stupidly as old-standing habits in human beings. Further, instincts are often incomplete at birth, as the pecking instinct in chickens, some practice improving the action.

Where the organic basis of instinct is very definite, instinct is indistinguishable from reflex action. The instinct, however, is primarily adapted by selection to the preservation of the species. Instinct, according to Hobbouse, is rather the 'tune' that reflex actions are 'set to,' the setting being secured by heredity. The term 'habit' is best reserved for the acquired dispositions and secondary automatic actions of the individual after birth. From intelligence instinct is distinguished both in genesis and in contents (Hobbouse). The activities of intelligence presuppose individual experience with conscious purpose, actual or preceding; the activities of instinct are performed without previous experience, and without any conscious purpose other than the satisfaction of response to the immediate and appropriate stimulus. Perhaps the strongest reason for not regarding the activities of instinct as intelligent is that in such enormously complex sequences of action as, for instance, the emperor moth carries out in the preparing of an escape-opening for itself on its completing the larval and passing into the imago stage, the intelligence needed would be so great that it could not be limited to this single activity, and yet it is so limited. It is more reasonable to assume that the apparently intelligent purposiveness is due to the superposition of instinct upon instinct until this co-ordination of high selection-value is produced and the species is thus preserved. On the other hand, when a certain crab stalks a sandhopper, the series of actions involves repeated adaptations in the course of the hunt to circumstances that cannot be foreseen. This indicates that the instinct is essentially a central co-ordination of reflexes, set going by a principal stimulation—just as the instinct to run from an enemy may involve a multitude of reflexes (e.g. increased respiration, quickened pulse, etc.), the impulse to escape being primary and focussing the others. As animals rise in the scale, their instincts become 'saturated with intelligence' (Hobbouse), until in the highest animals instinct tends to lapse and intelligence to predominate. Intelligence takes over the work of adaptation, and instinct de-

creases in selection-value. This decrease in the efficiency of instinct occurs whenever natural selection is prevented from operating. Lloyd Morgan suggests that this explains why the 'young jungle pheasants of Assam, when left motherless, die of starvation,' while the young megapodes, not being fostered by the parent, 'shift for themselves from the day of their birth.' In the one case the parent interferes, in the other not, with the action of natural selection. In the higher animals intelligence so interferes. In man most of the emotions are probably survivals of instinctive habits (see EMOTIONS), some of them being still serviceable, others being superseded by intelligence. The imperfections and variations that occur in the stress put upon the inherited co-ordinative nervous organization subserving instinct give openings for the operation of intelligence, which thus may be said to rise 'within the sphere of instinct' (Hobbouse).

Evolution of Instinct.—The Lamarckian view is that habits acquired by the individual are transmitted to the next generation, and, if useful for the preservation of the species, are continued as instincts. The evidence for this view is inconclusive. It does not in any adequate way account for the enormous complexity of instincts such as that illustrated by the emperor moth, where the action occurs only once in the lifetime of the animal. Similarly with the complex habits of bees. The selectionist view is that animals showing useful variations in impulsive and reflex activities are preserved. Lloyd Morgan suggests that the plasticity of the individual organism frequently results in modifications that, though not themselves transmissible, are adaptive, and have selection-value. These may afford conditions for the growth and strengthening of adaptive variations in the same or allied directions. Modification and variation thus act towards the same end.

The variations that might result in instinct may be classified into two orders—first, variations in reflex actions capable of being co-ordinated through some special sense or special peculiarity of the species (e.g. smell); second, the survival of variations that have grown up under protection of intelligence, and are doubtfully named 'lapsed intelligence.' If acquired habits are not transmitted to succeeding generations, the theory of 'lapsed intelligence' must be modified into 'the selected survivals of intelligence.' In the evolution of instinct, as elsewhere, the co-adaptation of

many impulses and reflex actions for a single ultimate purpose presents difficulties. These tend to grow less when it is realized that all the multitude of actions may depend on a single sense, which, once become sensitive to a certain odour, drags, as it were, all the other activities in its train, so producing the appearance of elaborate intelligence. For instance, the parturient cat licks dry the new-born kitten, eats the placental membranes, chews off the umbilical cord to within an inch and a half of the abdomen, absorbs any excretions, and makes so perfect a 'puerperal toilet' that practically no spot remains. But a pregnant cat, accidentally present during parturition in the particular case—it was an older daughter of the same mother—took a share in cleaning the kittens as born. The smell had probably excited in her the series of maternal activities a full week before her own confinement. This fact was observed by the present writer. Like so many others, it suggests that 'co-adaptation' may be rather a focussing of several instincts than a parallel development of them separately. The focal variation, once secured, offers to natural selection a single item to work on. In different degrees all variations having selection-value act in this way, so modifying the whole organism. A complete theory of instinct is still to seek.

See Darwin's *Origin of Species*, ch. viii. (1859); Headley's *Problems of Evolution* (1900); L. T. Hobhouse's *Mind in Evolution* (1901)—important for philosophical standpoint; Lloyd Morgan's *Introduction to Comparative Psychology* (1894), *Habit and Instinct* (1896), *Animal Life and Intelligence* (1890-1); Romanes's *Animal Intelligence* (1882), and *Mental Evolution in Animals* (1883); J. Arthur Thomson's *The Science of Life* (1899)—for history of theories and criticism; text-books of psychology—in particular, Baldwin (1891) and James (1890).

Institute. In Scots law, when there is a destination of property to several persons in succession, the first person to take it in such succession is called the institute, and those after him substitutes. (See SUBSTITUTION.) A conditional institute is one who is called to succeed contingently on failure of other persons prior to the time when the destination is to take effect.

Institute of France. See ACADEMY.

Institutes. Four volumes of Institutes, the first of which was a commentary on Littleton's *Tenures*, were published in 1628-44 by Lord Coke. For Justinian's *Institutes*, see CIVIL LAW.

Institution, a formality preceding induction, whereby a bishop invests a parson with the spiritualities of his benefice. By the Clerical Subscription Act, 1865, the parson must declare his assent to the Thirty-nine Articles, undertake to use the Book of Common Prayer and none other, make the declaration against simony, and take the oath of allegiance. A bishop may refuse to institute for simony, unorthodoxy, ignorance of Welsh (in Wales), and probably for habitual drunkenness. The fees for institution are £7, 13s. 6d.

Instrumentation, or ORCHESTRATION. See ORCHESTRA.

Insures, a tribe of Gauls, who, about the 5th century B.C., crossed the Alps and settled in Cisalpine Gaul, in the north of Italy. Their chief town was Mediolanum, now Milan. They were first conquered by the Romans in 222 B.C., but Hannibal's invasion of Italy restored them their freedom until their final conquest in 196 B.C.

Insulation of Electric Wires and Cables. See ELECTRIC CABLES.

Insulation Resistance. See ELECTRIC TESTING, ELECTRICITY—*Insulators*.

Insulators. See DIELECTRIC, ELECTRICITY—*Insulators*, ELECTROSTATICS.

Insurance. (1.) LIFE INSURANCE. See ASSURANCE. (2.) FIRE INSURANCE.—Fire insurance is a contract of indemnity, whereby the insurer (the company), in consideration of an agreed payment, termed the 'premium,' contracts to make good to the insured, up to the limit of the sum stipulated, any loss or damage through fire to the property specified in the policy. But the amount which can be claimed from the insurance company in the event of a fire, while limited to the amount insured, cannot exceed the loss incurred. In England, fire insurance may be said to have originated in its modern form immediately after the great fire of London in 1666. In 1696 the Hand in Hand—the oldest of the British offices—was founded on the mutual principle. In case of fire the measure of the loss is the value of the property at the date of the fire, and not at the time the insurance was effected. For the other limitations of the contract, recourse must be had to the conditions contained in or endorsed upon the policy (see below).

It is essential that the party proposing the insurance should have an insurable interest in the property to be insured. This is a statutory principle laid down by the Act of 1744, commonly known as the Gambling Act,

which was passed in order to put a stop to gambling in speculative insurances on events of every description. The act also provides that the name of the party interested shall appear in the policy or contract, and the sum receivable thereunder is limited to the amount of the insured's interest in the subject matter of the insurance. Generally speaking, however, expectations and contingent interests are excluded. The capacity in which the party insures, and his relation to the property—whether as absolute owner, or as holding it in trust or on commission—should, though perhaps not necessarily, be stated. The proposer is generally required to say whether the risk has been declined by any other office, and what, if any, insurances on the property are subsisting at the time.

A fire insurance policy in its usual form is numbered and stamped (irrespective of the amount) with ld. stamp. It is dated and signed on behalf of the company, and contains, on its face, the following other particulars—the name and address of the insured; a description of the property; the total sum insured, apportioned, if necessary, among the specific items; a statement of the periodical premium payable, with an acknowledgment of payment of the first premium; and an agreement on the part of the insuring company (subject to conditions usually printed on the back of the policy) to pay or make good all loss or damage by fire or lightning to the property described, up to the amount specified against each item, but not exceeding in all the total sum insured.

The conditions usually printed on the back of the policy provide for:—The voiding of the policy in the event of any material misdescription of the risk, or failure to notify subsequent changes therein. The exclusion of items not held by the company as coming under any general description in the body of the policy, as well as of loss or damage by fire arising from some extraordinary cause, such as war or riot; or from something inherent in the subject matter, such as fermentation, spontaneous combustion, or explosion (unless of gas or boilers in dwelling-houses). The cessation of the insurance on the transfer of the property (otherwise than by will or operation of law) without notice given to the company and endorsement of the policy. Prompt intimation of any claim under the policy, with a detailed statement of the value at the time of the articles destroyed or damaged. The reser-

vation of the company's right to reinstate the property instead of making payment, as also of its right to take possession of the property for the purpose of adjusting the claim. The rateable apportionment of the loss in event of the property being insured elsewhere. The application of the principle of average, if provided for in the policy itself. A reference to arbitration in event of any difference arising between the company and the insured.

Of the conditions summarized above, that relating to the important principle of average requires special notice. It only applies if provided for in the policy itself. On the Continent it is embodied in all policies, but in Britain and in America it is usually confined to what are termed 'floating' or 'blanket' policies, covering goods located not in one place, but in several different places, such as docks, warehouses, and bonded stores, and subject to change, removal, or substitution. The average clause comes into operation in event of a partial loss of property insufficiently insured, its effect being to make the insured his own insurer for the excess value of the property, and so liable for his rateable share of the loss, just as, in the case of more than one actual insurance on the property, each office is liable only for its rateable portion of the loss.

The insurance is usually for a year up to and including the date of renewal, and is usually renewable on one of the English or Scottish quarter days. Fifteen days of grace are usually allowed (on yearly policies) for payment of a renewal premium. This does not, strictly speaking, amount to an extension of the insurance, but applies only to the renewal of it, so that after the renewal date the risk is borne by the insured himself, until the renewal premium is paid. But the strict law is modified by the companies issuing a renewal notice, expressing their willingness to renew the insurance; and their practice is to pay a claim arising within the days of grace, unless it is clear the insured had no intention of keeping up the policy.

The principal fire offices in Britain, though, of course, quite independent of one another in all other respects, voluntarily combine for certain purposes in the Association of British Fire Offices, or the Tariff Association. This was formed in 1858, and has for its main objects (1) the collection of the experiences of the different offices with respect to their various risks; (2) the fixing of tariffs for special risks, which

are to be adhered to by the combined offices; and (3) generally, the securing, as far as possible, of uniformity in the contracts of the offices. A tariff based upon combined data is justified in the public interest by the notorious tendency of fire offices, under the stress of unrestricted competition, to reduce their rates of premium to a point below which the business can be successfully carried on. A yet further justification is found in the necessity all companies are frequently under of reinsuring with other offices a part of their larger risks.

It is only certain risks, however, for which the Fire Offices Association draws up, and from time to time revises, a minimum tariff to be adhered to by its members. Risks not so scheduled each office is free to insure on its own terms.

Of non-tariff risks the lowest rates are private dwelling-houses, stone-built and slated, and in no hazardous proximity, which (or the rents thereof) can be insured at 1s. 6d. per cent. (£100) per annum. In the same category may be classed church buildings, farm-houses (excluding outbuildings), public hospitals, libraries, and workhouses. Next come shop buildings (at 2s. per cent.). Among the more hazardous non-tariff risks may be mentioned cabinet warehouses (from 3s. 6d.), conservatories and greenhouses (4s. 6d.), drapers, haberdashers, and mantle-makers (number of assistants limited, 3s. 6d.).

The following is a list of some of the risks scheduled for tariff purposes:—

Boot factories, from 7s. 6d.; boot warehouses, from 2s. 6d.; cement works, from 3s., according to process; corn and cotton mills, special; farms—produce and implements, 7s. 6d. or 10s.; livestock, 3s.; flannel mills, from 10s. or 12s.; flax mills, 10s. and 20s. to 40s. (less for wet processes); flax warehouses, normal, 5s. and 7s. 6d.; furniture stores, normal, 5s.; potteries, normal, 3s. to 7s. 6d.; ships in dock or harbour, from 3s.; shops in which combustibles are kept, various rates; warehouses, etc., in particular towns (mostly seaports), such as London, Liverpool, Glasgow, Manchester, Bristol, Hull, Dublin, Belfast, rates according to circumstances; wool and worsted factories and warehouses, from 2s. for warehouses, and 7s. for mills.

The business of fire insurance, like that of life assurance, is founded on the doctrine of averages in the mathematical sense of the term, yet the element of uncertainty enters into it to an immensely greater degree. The individual risks are vastly more

diverse in character; the personal equation, or moral hazard, is a more powerful factor; and the event when it does issue is much more variable in scale. Hence the business of one year may show a large profit, that of the next, even in the best companies, a considerable loss. With regard to the constitution of a fire company, whether on the mutual or the proprietary (or shareholding) principle, the latter would appear to be the better. Not only is the shareholders' capital, paid-up and uncalled, available in the last resort, but the responsibility of the management is undertaken by directors pecuniarily interested in the company's welfare. And in fact, out of the numerous companies that have been established in Britain, the mutual system forms an insignificant proportion of the whole.

In the case of nearly all British offices the capital constitutes the ultimate reserve for the protection of the policy-holders. But as the paid-up portion of it primarily represents the shareholders' funds, in respect of which they look for an annual dividend, it is necessary for every office to form various reserves, which are built up and maintained out of income. These principally consist of a substantial proportion of the annual premiums to provide for unexpired risks, and a general reserve fund for unforeseen contingencies, such as exceptionally heavy fire losses. For example, in 1861 the Tooley Street fire in London caused damage to the extent of over £1,000,000; in the Pantechnicon fire, London, in 1874, the damage was close on £2,000,000; the Chicago fire in 1871 damaged property to the extent of £50,000,000.

The main source of the revenue is, of course, the premium income. A second item of revenue is the income from invested funds (paid-up capital and reserve), in the form of interests, rents, and occasional profit on investments.

The principal items of outgo are claims, expenses (including commissions to agents), and dividends to shareholders. Expenses in the best companies should not average more than from thirty to forty per cent. of the premium income. The expense account of the year closes with the year, being defrayed out of premiums. Not so, however, the claims or loss account. It would be so if all policies were renewable annually on 1st January. But in the case, say, of a company starting business on 1st January, the insurances will be effected at all periods of the year; and thus on an average only half a year's losses will have been incurred by the end of the year, there remaining

a half-year's risk, paid for, but not yet incurred. This unexpired risk should, strictly speaking, be provided for by reserving, say, one-half of the premium received in the year, less expenses. The practice in Great Britain is to make the transfer to reserve include the allowance for unexpired risk, instead of stating this item separately.

The following are material points in judging of the management of a company: the ratio (not, however, always obtainable) of premiums received to insurances effected; the ratio of expenses to premiums; the like ratio of claims; and lastly, the ratio of reserves to annual premiums.

(3.) MARINE INSURANCE.—The object of marine insurance is to indemnify against loss of property in the course of navigation. Thus the definition of fire insurance given above applies *mutatis mutandis*. In place of the building, its contents, or its rent, we have a ship, her cargo, her freight, or other insurable interest therein; and in place of the single contingency of fire, we have the manifold perils of the sea, or such of them as come within the scope of the particular insurance.

Marine insurance was practised by the Venetians in the 15th century. In England it was in active operation in the 16th century, and one of Queen Elizabeth's statutes speaks of it as 'an usage among merchants time out of mind.'

The ordinary policy of marine insurance in Great Britain conforms to a time-honoured type known as the 'Lloyd's Policy.' It contains blanks for the name or names of the insured, the subject insured and its value, the name of the ship and master, the commencement and termination of the risk, the voyage, the ports the vessel may touch and stay at, and it specifies the perils of the sea—'men-of-war, fire, enemies, pirates, rovers, thieves, jettisons, letters of marque, surprisals, takings at sea, arrestments, restraints, and detentions of all kings, princes, and people of what nation, condition, or quality soever, barratry (i.e. unlawful conduct involving loss or damage) of the master or mariners, and all other perils, losses, and misfortunes that have or shall come to the detriment or damage of the said goods, merchandise, and ship, etc., or any part thereof.' The insured are empowered to 'use labour and travel' for the defence, safeguard, and recovery of the subjects insured, the insurers agreeing to contribute to their expenses. By what is known as 'the waiver clause,' the insurers and insured are entitled, without

prejudice to their rights, to do all in their power to recover or preserve the property insured. Finally come the 'binding and indemnifying' clauses, and the policy is signed by the insurer or insurers, each stating the sum for which he underwrites the policy.

Marine insurance business in Britain is done by (1) proprietary or mutual companies, some of whom combine it with other forms of insurance. A list of mutual companies, with a statement of their accounts, appears in Bourne's *Insurance Directory*. (2) Associations of individual underwriters, the oldest and chief of which is Lloyd's. These join with each other in underwriting large risks. (3) The larger shipping companies themselves are able to do their own underwriting, keeping an account to which sums are periodically transferred, and out of which losses are made good. Some of these companies also insure their passengers' effects.

In marine insurance general average is the term applied to such loss or damage as is in the nature of a sacrifice for the common safety of the adventure, and which is contributed to by the various interests at risk, the name being used to denote the act which causes the loss, or the loss itself, or the contribution which is levied to equalize it as between the interests. This rule of contribution seems to have been first laid down in the Rhodian law—'*si levandæ navis gratia jactus mercium factus est, omnium contributione sarcietur, quod pro omnibus datum est*'—which was incorporated in the Roman law. The practice thus established was confirmed by the laws of Oléron and other ancient maritime codes, and so became embodied in the general maritime law of Europe. At first the rule was applied only to sacrifice by jettison, but it came to be extended to all sacrifices made for the safety of the common adventure. The principle is also applied where the damage is caused by putting the subject-matter to an extraordinary use, of which an often cited case is turning a small boat adrift with a lantern, in order to mislead a pursuing enemy; while modern conditions have supplied such instances as the burning of spars for fuel for a donkey-engine to keep down a leak, after the ordinary fuel, of which a reasonable quantity had been provided, was exhausted; and the expense and damage caused by the intentional working of the engines when the vessel was fast aground in a dangerous place, in order to facilitate refloating with the rise

of the tide. But the use of things in the ordinary course, even if excessive, will not constitute a general average act; thus, for instance, damage through carrying a press of canvas to escape a privateer or a lee-shore is not a subject of contribution. Analogous to general average losses are general average expenditures—extraordinary expenditures incurred for the safety of the common adventure, such as, in certain cases, salvage and port of refuge expenses. The contributory interests, speaking generally, are the ship, the cargo, and the freight; the various owners of these contribute rateably to make good the loss, the owner of the damaged or sacrificed property being assessed for contribution in the same way as the others, so that ultimately he is placed in the same position as if the sacrifice had been made of the property of another of the co-adventurers. But seamen's wages, passengers' luggage, and the personal effects of both passengers and crew, are exempt from contribution. Deck cargo contributes, but the jettison of it does not give the owner a right to contribution from the other interests, unless there be a special agreement with the other parties, or unless such carriage on deck is in accordance with the custom of the trade. Where a party who would otherwise be entitled to contribution has, by his own fault, contributed to the peril to avoid which the loss or sacrifice is made, he is disentitled from so recovering. The adjustment of general average has become a difficult problem, and there are important divergences between the laws of the various countries. This matter has received attention at several conferences, and the principal outcome has been what are called the York-Antwerp Rules; these have no legal force in themselves, but they are generally incorporated by reference in the contract of carriage.

(4.) ACCIDENT INSURANCE.—Strictly speaking, the term 'accident,' in the sense of 'contingency,' covers the whole field of insurance. But marking off on the one hand the larger risks of death, fire, and maritime loss, and on the other the minor casualties of life, there remain bodily accidents incapacitating from work and involving medical expense, the business of insurance against which comprises (1) personal accidents, and (2) the liability (especially under recent legislation) of employers for accidents to their workmen.

The origin of personal accident insurance is coincident with the sudden development of railway

travelling in the early 'forties of the 19th century. In 1845-50 no fewer than thirteen accident companies were projected. Only two of them were actually founded, one of which, the Railway Passengers Company, still exists. Its scope was at first confined to railway accidents, but was, in 1855, extended to general personal accidents.

Walford and Professor de Morgan were the first to point out (about 1860) the necessity of dividing the insured into classes to which different rates of premium were applicable. Their classification comprised (1) professional men and others not specially liable to accidents by reason of their occupations; (2) master tradesmen superintending their businesses only, without actually taking part therein; (3) mechanics and workmen generally, engaged in comparatively non-hazardous occupations; (4) those engaged in hazardous work; with (5) a class usually uninsurable. An accident company's prospectus now usually contains a table of occupations classified more or less on these lines.

A further step in systematization was taken when, a few years later, one company adopted the principle of 'specific compensation.' This consists in setting against specific injuries fixed sums proportioned to the maximum sum payable in case of fatal accidents. As many as thirty-eight different injuries were specified, ranging from the loss of both eyes, arms, or legs, for which £250 (per £1,000 in event of death) was payable, to the dislocation of the shoulder or fingers, involving a claim of £10. The usual present method is to insure fixed single payments in event of death or loss of hands, feet, or eyesight, a pension for life in event of permanent total disablement, or a weekly allowance in event of temporary total or partial disablement. For a small extra premium many companies add a weekly allowance in event of temporary total disablement from specific illnesses, such as typhus, typhoid, or scarlet fever, smallpox, diphtheria, or measles.

The basis of the contract is the proposal which embodies statements as to occupation, physical condition and health, and as to other previously existing similar insurances, if any. On these statements the companies have mainly to rely, medical examination being generally dispensed with. The question as to 'other existing similar insurances' is asked with the view of preventing over-insurance, and securing that the contract shall be, to that extent, of the character of an indemnity.

The rates of premium are uniform (for the proposer's class) at all insurable ages, generally between sixteen and sixty. The company reserves the right to determine the policy at the end of any year. As to the business generally, it will be obvious that exceptional care and shrewdness on the part of the management is required for its successful conduct, as well as the readjustment of its details from time to time to correspond with changes in the conditions and mode of occupation, travel, and recreation.

Accident insurance has been taken up by many periodicals, which with the purchase of the current number guarantee a fixed insurance, covering the period till next issue.

(5.) EMPLOYERS' LIABILITY INSURANCE. — Employers' liability insurance is a strict indemnity contract by which the insurers undertake, in case of accidental injury to a workman in the course of his employment, to pay the compensation for which the employer is liable at common law, or under the Workmen's Compensation Act, 1897, which amended and extended the Employers' Liability Act, 1880. The Act of 1897 covers most of the important employment, but does not apply to domestic servants, farm labourers, or workshop employés. Moreover, the right to compensation is extended so as to be barred only by 'serious and wilful misconduct' on the part of the workman as the cause of the accident.

As the result of these acts great numbers of insurance schemes came into being, including those of mutual associations of employers in various trades. The premium payable is usually based upon the amount of the wages paid. The rates of premium vary with the nature of the occupation, but the data are so uncertain that quotations differ widely with different companies, and even vary with the same company from time to time.

(6.) FIDELITY GUARANTEE. — This branch of insurance is generally carried on by accident companies, though some companies make it their sole business. It enables persons holding positions of trust to obtain the necessary security without recourse to friends. The bonds of respectable offices are generally accepted by government and public institutions. In some cases it suits a large employer to effect the insurance himself. For this purpose the companies issue either a collective policy in which the names of the employés are scheduled, with the specific sum up to which each is covered, or a floating policy may be drawn up cov-

ering any or all of the employés up to the maximum sum insured. Private sureties themselves may effect an insurance to cover the risk they have undertaken. The rate of premium in any case depends generally upon the nature of the employment, the duties to be performed, and the mode and rate of the remuneration. The policy will usually stipulate for reasonable supervision on the part of the employer.

(7.) CASUALTY INSURANCE. — Under this head may be classed all the miscellaneous branches of insurance affording protection against such contingencies as bad debts; birth of twins; breakage of plateglass; burglary; loss of keys; damage to boilers by explosion; damage to carriages, cycles, and motors; damage to crops from hail or flood; death or disablement of horses and cattle; depreciation of debenture bonds and stock; depreciation of property from loss of licence; loss of property contingent on marriage, on the birth or failure of issue, on a change of name, armorial bearings, or religion, or through defect of title or the termination of a lease. Marriage, issue, and 'name and arms' risks are undertaken by most life offices. For particulars of offices doing other classes of business, reference may be made to *Champons and Co.'s Insurance Bluebook and Guide*.



Intaglio: Assyrian Cylinder, and Impression.

Intaglio is the term applied either to a method of engraving or to a gem engraved in that particular style. Etching is one of the chief forms, and in it the lines drawn by the artist upon the prepared surface are bitten by acid into the plate, and form hollows in its face. In photogravure and some of the allied mechanical processes so greatly used for reproducing pictures and drawings, an intaglio is produced by photographic and scientific means in a metal plate, from which impressions are printed. In a stricter sense, an intaglio is a gem, usually of onyx or some other variety of chalcedony quartz, in which a design has been hollowed out, so that, when the gem is pressed upon any soft material such as wax, it gives an impression in relief of the nature of a cameo. Intaglio gems are of very ancient origin, and fine examples are highly esteemed as works of art. In Egypt and early Greece and Etruria they were

either of scarab or seal form; while in Babylonia and Assyria they took the form of cylinders round which the subject was engraved, the impression being obtained by rolling the cylinder over the surface to be impressed.

Integration, in mathematics, the inverse process to differentiation. (See CALCULUS.) It is essentially a summation of a series of values of a continuously varying quantity. We may, for example, consider the area of a region enclosed by a known curve or combination of known curves. The problem is, given the boundary, to find the area; and the general mathematical process by which this is effected is the process of integration. Except in a very few simple cases, such an integration cannot be effected; but by a graphical process it is possible to calculate the numerical value of any area to any required degree of approximation. There are many mathematical expressions which cannot be completely integrated unless the integration is effected between certain values of the variable known as the limits. Such integrals are called *definite integrals*, and their discussion forms an important branch of mathematics. As an example, consider the integral

$$\int e^{-x^2} dx, \text{ the recognized mode of}$$

stating the problem to find the quantity whose rate of change gives the quantity e^{-x^2} . This integral cannot be given as a known function of x ; but its value between the values $x=0$,

$$x=\infty \text{ is } \frac{\sqrt{\pi}}{2}.$$

Integument. See SKIN.

Intelligence Department. This is a most important branch of every modern army, as to it is entrusted the preparation of maps and plans of every possible theatre of war, together with the collection of all available information. The British army has always suffered through the lack of a properly organized department of this nature upon a sufficiently large basis, and steps have recently been taken to remedy this. The intelligence branch of the Indian army, however, is one of the best of its kind in the world.

Intendant, a name given in France, before the revolution, to the officials at the head of a province. Their origin dated back to the reign of Francis I. (1494-1547), the founder of the *ancien régime*. During the time of Richelieu the powers of the office were enlarged (1629). The National Assembly abolished the office in 1789, and established an elective adminis-

tration in its place; but Napoleon restored the dignity under the title of prefect.

Interbourse (or **International Securities**, a term used for stocks and shares—such as Russian bonds and American rails—dealt in indiscriminately on the London market, or the Paris bourse, or the stock exchanges of Germany, Austria, Holland, and New York. A large part of the remittances between countries is now conducted by means of the purchase and sale by arbitrage dealers, whose operations have a strong influence on the exchanges.

Intercalary Days or Months are such as are inserted from time to time in the calendar, out of the ordinary course, in order to bring a conventional but inexact reckoning of the year into agreement with the true or solar year. The 29th of February in leap-year is an example.

Interdict. (1.) In Scots law, an interdict corresponds pretty nearly to the English injunction. It is an order or decree of the Court of Session to prevent or restrain the interference with legal rights. It may be perpetual or interim. An interim interdict is granted where convenient in the course of litigation to restrain the interference with an alleged right pending the decision of the question at issue. The complainer is generally required to find caution to indemnify the respondent if he fails to prove his right. Interdicts are also obtained in the sheriff courts on petition; and the burgh courts have jurisdiction in this respect within the burgh, but it is seldom exercised. (2.) The papal ban which interdicted the administration of religious rites throughout districts, or to individuals under ecclesiastical discipline. In 1170 and 1180, Pope Alexander III. laid England and Scotland under interdicts; Gregory VII. placed Poland under interdict in 1079, after the murder of Stanislas, bishop of Cracow, before the altar, by Boleslas II.; Innocent III. laid an interdict on France in 1200, and on England, under John, in 1208.

Interest and Usury. Interest is the payment made for the use of capital, or the return obtained from its employment. It bears an agreed upon fixed ratio to the sum loaned, and is paid at stated intervals, usually half-yearly. In medieval society the receipt of interest was condemned by the canon law. The odium excited by the Jews, which led to their formal expulsion from England by Edward I. (1290), was largely due to the prejudice caused by the nature of their usual calling—

that of money-lenders. Capital was at that time lent and borrowed, not to promote business or industry, but to assist distress or relieve emergency. But as the scale of business extended, and opportunities offered for the wider use of capital, the letter of the law prohibiting usury continued to be observed, but its spirit was set at naught. Means were discovered for permitting necessary developments; and eventually interest itself was no longer forbidden, although a maximum rate was prescribed. Nevertheless, where risk was incurred of possible loss, as in the case of bottomry (or money advanced on the security of the cargo of a ship), interest had been permitted by the canon law. The inconsistency became obvious when the goldsmiths became prominent in the 16th and 17th centuries as intermediaries between those who had capital to lend and those who desired to borrow. The usury laws, fixing a maximum rate of interest, were in effect a recognition of the legality of the act of receiving or paying it. In 1546 and 1571 the rate was fixed at ten, in 1624 at eight, in 1651 at six, and in 1714 at five per cent. In a modern business community, where a large amount of enterprise is conducted with borrowed money, it becomes obvious, on the one hand, that the borrower, putting the money to a profitable use, is able to give a return for the capital he has borrowed; and, on the other, that the lender will not be induced to lend unless he obtains some reward for foregoing his own expenditure. There is a general agreement that adequate means should be taken to make the borrower aware of the real nature and ultimate consequences of his action in affixing his signature to a document; but the grant of a discretionary power to the magistrate, by the Money-lending Act of 1900, to reduce excessive interest, is a more doubtful policy. That the rate of interest will vary with the security on which the loan is made is a commonplace. Some economists have even drawn a distinction between true and false interest—the former represented by the ordinary rate obtained on good security, the latter containing in addition an element of insurance against peculiar risk. With the advance of a country in civilization, and the growth of security of person and property, the rate of interest tends generally to fall; for opportunities for the employment of the capital, which has become more abundant, diminish in number, or are less profitable. Such a fall is shown by the rise in the price at which

gilt-edged securities can be purchased, or by the conversion of government or other first-class stock into stock bearing a lower rate of interest, under the compulsion of a threat to redeem the stock altogether. Interest may be either simple or compound. In the former case interest arises on the principal sum only; whereas in the latter case interest arises not only on the original sum, but also upon any unpaid interest which may have been added to it, and has thus formed a new principal sum. For bank rate, etc., see BANK. See also the books mentioned under CAPITAL, especially E. von Böhm-Bawerk's *Capital and Interest* (1890), and *The Positive Theory of Capital* (1891). For an account of the attitude of the canon law, see Professor W. J. Ashley's *Economic History*, part ii, ch. 6 (1893). Jeremy Bentham's views were stated in his *Defence of Usury* (1787).

Interference is a principle of fundamental importance in wave motion, affording an almost immediate explanation of many curious phenomena in sound, light, and other forms of radiant energy. Some of the results of interference may be observed in the case of ripples or waves on water. Suppose, for example, that two stones are dropped into a still pond simultaneously some distance apart. Each will generate a set of circular ripples traveling outwards from the disturbed point. Ere long the one set of ripples will meet the other set, and a checkered pattern of crossed wavelets will be produced. At any instant the greatest disturbance will be where crest and crest of the meeting ripples coincide, or where trough and trough coincide. But at certain positions the crest of one ripple will coincide with the trough of another; and if these ripples are of the same size, the disturbance at this particular point will be nil. Between these two limiting cases of two waves coalescing in the same phase and in opposite phase there are all possible intermediate gradations, so that as we pass in imagination instantaneously along the surface we pass through all magnitudes of disturbance from the greatest possible to the least possible.

Let us apply the principle to the explanation of beats in sound. When two notes of nearly the same pitch are sounded together, the resultant sound varies in intensity, increasing and decreasing in loudness in a regular rhythmic manner. Since the loudness of a sound must depend upon the magnitude of the disturbance, it follows that the resultant disturbance is greatest when the

sound is most intense. But in this case the resultant disturbance is greatest when the two trains of waves come together crest to crest and trough to trough. This coincidence, however, cannot last, for in one set the waves are following one another at a slightly quicker rate than in the other. Ere long this set will have gained half a wave length on the other, and crest will fall with trough, producing a greatly diminished disturbance, with an accompanying greatly diminished intensity. But in this condition also there is no permanency. The set of more rapid vibration will continue to gain on the other, and after another interval the condition of weakest intensity will be followed by a condition of strongest intensity, there being now a whole wavelength gain, and crest and crest once again falling together. It is easy to show that if the two notes have m and n vibrations per second, the number of beats per second will be $m - n$. If this difference exceeds twenty or thirty vibrations per second, the ear can no longer distinguish the separate beats, and another phenomenon presents itself. (See SOUND.) Beats are often heard, especially on harmoniums and organs, when the notes sounded are nominally far apart in pitch. But in this case the beats arise from the slight imperfections in tuning, so that certain of the higher harmonics which, with perfect tuning, would have exactly the same frequency, differ in frequency by a few pulses per second. These accordingly produce beats like any other pair of notes of nearly the same pitch. When two notes have been tuned so nearly to the same pitch that the most acutely musical ear could not appreciate any difference in pitch on the notes being sounded successively, the most ordinary ear will recognize that there is not perfect tuning by the beats which are heard when the notes are sounded together. Indeed, it is by means of the beats that the final tuning of two notes is accomplished, the string or pipe, as the case may be, being adjusted till the beats, becoming fewer and fewer, ultimately cease to be distinguishable. With the tempered scales of our pianos and organs the beats are never wholly eliminated.

Interference effects in light are of great variety and beauty. Two sources at least are necessary, and these must be in some way derived from the same original ray. The reason of this is to be found in the great complexity of the vibration which constitutes light, and in the fact that the vibrations take place in all possible planes at right angles to the

direction of the propagation of the wave. Under these conditions it can be shown mathematically that we cannot, by combining two trains of equal waves vibrating in mutually perpendicular planes, obtain interference effects visible to the eye. We cannot get the necessary alternations of brightness, because a displacement in one direction cannot be destroyed by a displacement in a direction perpendicular to it. Thus we are compelled so to arrange matters as to produce interference by bringing together simultaneously two rays which were originally parts of successive portions of the same ray. The form of the vibrations in these two rays will be practically the same, and alternations of brightness may be produced by their coming together in different phases. The simplest experiment to explain on these lines is the production of colours in a soap film or a thin transparent plate. Imagine a ray of light to fall obliquely on the surface of a thin plate. Part is reflected at the first surface, and part after refraction through the plate; and reflection from the second surface finds its way out again parallel to the first reflected part. Hence we shall have, travelling along the same path to the eye, light which has suffered only one reflection, and light which, by experiencing two refractions and one reflection, has come by a slightly longer path. The parts of these two streams of light, which enter the eye simultaneously, were originally separated by a certain distance in the original single ray. One part of the original ray has, in fact, been made to lag behind the other, and if the amount of lag is equivalent to, say, one wavelength of blue light, the resultant blue will be made more intense than the resultant green, yellow, or red. Hence the light will no longer appear white, but will be tinted blue. With a slightly thicker plate, under the same conditions, or with a slightly greater obliquity of incidence, the lag will correspond to a wavelength of a less refrangible ray, such as green light or red light. In this way we readily explain the beautiful play of colours in the soap film, the ever-changing thickness of which is accompanied by a corresponding change of tint. The phenomenon is, however, studied better in the form known as Newton's rings. A convex lens of small curvature is pressed close to a plain glass surface, and a ray of light is then made to pass through the lens, and be partly reflected internally at the curved surface near the plate, and also at the upper surface of the plate.

In short, a film of air plays the rôle of the thin plate. As we pass out from the point of contact of plate and lens the thickness of the air film gradually increases, according to a definite law, and the colour produced by the interference of the two rays will depend upon the particular part of the lens from which the rays come, and upon the angle at which the whole is viewed. The result is that a series of coloured rings are formed concentric with the point of contact of lens and plate, and that the colours follow a regular sequence. When the apparatus is viewed in homogeneous light—*e.g.* in sodium light

chief are the Ratisbon Interim (1541), the Augsburg Interim (1548), and the Leipzig Interim (1548).

Interlaken, summer resort, canton Bern, Switzerland, on l. bk. of the Aar, in the Bördeli, a plain between the lakes of Thun and Brienz. It is annually visited by between 30,000 and 40,000 tourists. Pop. (1900) 2,962.

Interlineations, in law. In England, alterations or interlineations in a deed are presumed, in the absence of evidence to the contrary, to have been made before execution; but in a will after execution if the will is complete without them, and

Interlocutory Proceedings, in law, are those which occur between the writ and the final hearing of an action. Interlocutory orders are not final, and are generally directed to the more convenient hearing of the case—*e.g.* order for the production of documents, or to prevent any disturbance of the rights of the parties pending the hearing.

Interlude, the usual 16th-century name for a play, especially a play given by professional actors on a public stage, or in a royal or other hall. The term was also applied, although less freely, from an early date to



Interlaken and Jungfrau.

—a great number of bright and dark rings are seen, the dark spaces corresponding to the regions where the interfering rays differ by an odd number of half wave-lengths, and the bright spaces being where they differ by an even number. Some particularly fine effects of interference are met with in experiments on polarized light. See POLARIZATION OF LIGHT.

Interim, a term applied especially to certain decrees which were passed by the diets during the reformation in Germany to regulate points of difference between the Roman Catholics and the Protestants, until a general council could be held. The

before execution if the will is incomplete without them. In a deed material alterations or interlineations made after execution invalidate the deed, while in the case of a will they have no effect unless executed in the same manner as the will. In Scotland, interlineations are mentioned in the testing clause, or they will be presumed to have been made after execution, and will vitiate the deed. In a holograph will interlineations in the handwriting of the testator will be held valid.

Interlocutor, in Scots law, the written instrument containing the judgment or determination of the court.

the popular miracle plays of the middle ages. An example may be found in the 13th-century *Interludrum de Clerico et Puella*, founded on the popular *fabliau* of *Dame Siriz*. But until the end of the 15th century the plays given on such occasions were more often adaptations of the popular miracle plays, and the performers wandering artisans or villagers. The interludes of the 16th century were played either by the professional players or by amateurs, schoolboys, or gentlemen of the royal chapel, of the Inns of Court, and of the universities. They are shorter and simpler than the old miracle plays and

moralties. Often they had the same religious or ethical subject-matter; at other times they drew upon the farce themes of the minstrels. The interludes of John Heywood, the epigrammatist, written for the court of Henry VIII., belong mainly to this latter type. Gradually they took the place of the mediæval types of drama as a popular amusement. Thomas Cromwell and the other English adherents of the reformation used the players of interludes to satirize the church and spread heretical doctrine, and this led to a system of control over the drama by the Privy Council, which, once established, was not readily relaxed. See J. P. Collier's *English Dramatic Poetry* (1831, 1879); A. W. Ward's *English Dramatic Literature* (new ed. 1899); E. K. Chambers's *Mediæval Stage* (1903); Hazlitt-Dodsley's *Old English Plays* (1874-6); A. W. Pollard's *Miracle Plays* (1890; 4th ed. 1904); J. M. Manly's *Specimens of Pre-Shakespearean Drama* (1897); A. Brandl's *Quellen des weltlichen Dramas in England vor Shakespeare* (1898).

Intermarriage. Marriage between near relatives may be considered from a social or from a biological standpoint, but in either case it is from its influence upon the resulting progeny that intermarriage must be approved or condemned. The effects of parental consanguinity upon the offspring are but imperfectly understood, and the most diverse opinions as to its influence have at different times swayed mankind. On the one hand—even among savage peoples—religious, totemistic, and social laws have established barriers to prevent the union of members of one family, or even of one tribe. On the other hand, in some ancient civilizations marriage 'within the blood' of a ruling or conquering family or caste was frequently enforced, and the union of brother and sister (as amongst the Ptolemaic rulers of Egypt), or of uncle and niece, was lawful and customary. In most parts of the world, however, there is a consensus of opinion that intermarriage produces a weak and comparatively infertile stock, and the Christian peoples, influenced by the Mosaic law, consider marriage within certain prohibited degrees as an abomination and a crime. See MARRIAGE.

Intermediate State, the condition of the soul between death and the resurrection. Puritan and Protestant opinion generally is fairly well represented by the answer to Question 37 in the Shorter Catechism, 'The souls of believers are at their death made perfect in holiness, and do im-

mediately pass into glory'—i.e. on this view there is, strictly speaking, no distinct intermediate state at all. The Greek and Roman Catholic Churches, however, hold the view that there is for the dead a place, apart from both heaven and hell, where the soul awaits, or is gradually prepared for, its final destiny. (See PURGATORY.) Scripture certainly indicates that the soul passes at death into some state of weal or woe, but as certainly contains passages which imply that these states are not final—i.e. are not identical respectively with heaven and hell; cf. the clause in the Apostles' Creed, 'He descended into hell'—i.e. Hades—with Luke 23:43, 'To day shalt thou be with me in Paradise' (= Hades). Many ancient fathers believed that conversion was still possible in this middle region; and while this is not made absolutely certain by a passage like 1 Pet. 3:18-20 (Christ preaching to the spirits in prison), yet common reason seems to demand that death shall not make a final determination of the fate of those who have never known the gospel—e.g. the heathen, or children dying in infancy. Again, Christ's second advent, the resurrection, and the last judgment are spoken of as of the highest significance for all; and this could hardly be the case if to the dead at death there were already assigned their due recompense. Hence even conservative theologians like Dorner incline to the hypothesis of an intermediate state, where those who died without having heard the gospel will have a chance given them, and even those who died as unbelievers will gain deeper views of their alienation from God, and perhaps turn again; and where believers shall make constant progress in holiness, the whole process to be consummated at the resurrection. See HADES, HELL; also Dorner's *System of Christian Doctrine* (1880-2), iv. 401 ff.

Interment. See BURIAL.
Intermittent Fever. See MALARIA.

International, THE, or more fully 'The International Association of Workers' was founded in 1864. Karl Marx had issued an appeal for the formation of such an association in a pamphlet published in 1849; and two congresses, meeting in London in 1862 and 1864, had traced the failure of the people's movement to the lack of international solidarity among working men. Mazzini and Marx competed for the privilege of drawing up the programme. Marx was the favoured competitor; he never held any office in the association higher

than that of corresponding secretary for Germany, but he was its life and inspiration till 1872, when the great schism occurred.

The dominant and official party was Marxian in its views of peaceful economic evolution; but there was a strong section, headed by Bakunin, the Russian anarchist, which from the first aimed at obtaining control of the organization of the society. With this in view, Bakunin had merged his 'Alliance of Socialist Democracy' in the International. At first a kind of working compromise was formed. The International adopted violent revolution as a distant ideal, but its present methods were to be peaceful and educational in character. This suited Bakunin till he felt strong enough to fight for the control; and in 1872, at the Hague Conference, he challenged the official party. The end of the matter was that he was expelled from the association, and his followers left with him. The association never recovered from this blow, and it soon sank into insignificance.

International Law. Various branches of this subject are dealt with in special articles. Compare, for example, AMBASSADORS, ARBITRATION, BLOCKADE, EXTRA-TERRITORIALITY, NEUTRALITY, and so forth.

International law has been judicially defined as 'that collection of usages which civilized states have agreed to observe in their dealings with each other.' It differs in three important respects from other kinds of law:—(1) It is not made by any legislative authority; (2) it is not interpreted by any authorized judicial body; and (3) it cannot be enforced by any superior power. It shares with law the minor characteristics that it is interpreted in the light of precedent, and rests directly (as law does indirectly) on the consent of those who obey it. In all international disputes the final tribunal is war or arbitration.

The principal sources of international law are:—(1.) The law of nature, which has been frequently confused with the *jus gentium*, or law of nations, of Roman law. The former is mainly founded on a theoretical consideration of those moral laws which are believed to receive universal acceptance. The latter is an adaptation of the law of nature to the dealings of Roman law with aliens, whose rights were not recognized under municipal law; and it eventually became a scientific body of law constructed on an equitable basis. (2.) The opinions of experts on international law. International law was almost the creation of

Hugo Grotius (1583-1645), and its later developments have been the more influenced by professorial opinion because of the entire absence of judicial authority and statutory law on the subject. The conclusions of writers on international law can only be accepted without reserve when they are abundantly supported by precedent; and they have always shown a tendency to form theories in advance of the facts. (3.) Treaties and agreements between states. Treaties, of course, only bind the parties to them; but they may be important either as affording evidence of practice, or as declaratory of international law; and, of course, their value for this purpose depends on the number and importance of the signatories. (4.) The opinions of the law officers of a government on points submitted to them. Such opinions are chiefly useful as weapons against the government which invites them, and are of little authority in favour of that government. (5.) Decisions of public arbitration courts, to which weight is to be attached in proportion to the authority of the arbitrating states, and of the states which consent to be bound by the arbitration. (6.) Municipal courts which try questions of international law. (7.) Manuals and instructions issued by governments to their officers.

The unit of international law is the state, as the unit of municipal law is the individual. The essentials of a state are comparative permanence, the possession of fixed territory, some pretence to civilization, and independence of external control. But on occasions some recognition has been given to bodies which do not possess all these characteristics. Savage or imperfectly civilized states receive a degree of diplomatic recognition; and confederated states (such as Germany before 1866), protected states (such as Andorra or Monaco), and states subject to the suzerainty of others, may have a modified independence in external relations, though their rights may be restricted. Another instance of the recognition of bodies other than states is that of the belligerency of insurgents. When a state is divided by domestic warfare, other states may either ignore the condition of the country—and they generally adopt this course when their own subjects are not affected by the insurrection—or they may recognize the insurgents as belligerents; and this is almost inevitable when the insurgents are in possession of a seaboard. Though such recognition is completely justified, it almost inevitably provokes a protest, as was the

case when England recognized the belligerency of the Southern states in the American war of 1861. A state may even recognize the belligerency of its own insurgents, as, for example, by proclaiming a blockade. States the neutrality of which is guaranteed occupy a somewhat anomalous position in international law. Instances are afforded by Switzerland, Belgium, and Luxembourg, the international rights of which are modified by the fact that they are bound to observe the neutrality which is perpetually guaranteed to them.

The rights of a state are:—(1) To organize itself as it chooses—thus the French revolution, *per se*, did not afford a *casus belli*; (2) to act within its own dominions as it pleases, subject possibly to the limitation that its government must not be such as to constitute a scandal; (3) to occupy unappropriated territory other than the open sea, which cannot be a subject of property. A state may acquire territory by occupation (though discovery unaccompanied by occupation does not confer a sufficient title), by contract, by gift, by prescription, and by accretion. Modified rights over territory are acquired by protectorates, which do not form part of the dominions of the protecting state, but are yet, in their external relations, controlled by them. Protecting states are responsible for the safety of aliens in the protectorate. Spheres of influence are still more indefinite. The state undertakes no responsibility for the safety of aliens, but claims to exclude the control or interference of other states. In external relations the chief right of a state is that of preserving itself and defending its subjects. Thus, if a friendly state is made the centre of an attack by unauthorized persons on another state, the latter may take any measures that the urgency of the case may require to ward off the attack, without affording a legitimate *casus belli* to the friendly state whose territory may be violated by its action; and a subject of one state residing in another state, though subject to the law of that state, is entitled to be protected, both in person and in property, against any unlawful acts. Intervention is, unlike mediation, a hostile act, and, broadly speaking, it is only justified on the ground of a breach of international law, or because it is authorized by the opinion of the whole body of civilized states. War is no longer preceded by a declaration; but a prompt notification to other governments is necessary, in order to ensure neutrality. The detention of

subjects of the enemy on the outbreak of hostilities is now illegal. They are nearly always given a period within which to withdraw, and, except in case of necessity, they are not now generally expelled. Generally speaking, an enemy should inflict as little loss as is consistent with military success on non-belligerents, and the right to bombard unprotected towns for the purpose of destroying the sources of national wealth, though asserted by France, is hotly disputed. Except in cases where the population rises *en masse* to repel an invader, a belligerent will not be treated as such unless he has a recognizable uniform or badge which cannot be readily removed, is governed by a responsible leader, openly carries arms, and obeys the laws of war. The following practices are discountenanced by the Declaration of Brussels and the Hague Convention:—The use of poison or poisoned weapons; the use of arms or projectiles calculated to inflict suffering out of proportion to the military advantage they secure the use of flags of truce, or the badge of the Geneva cross, to cover military operations; the treatment of balloonists as spies; the refusal to give quarter; the massacre of prisoners; attacks on undefended towns; the bombardment of artistic, scientific, or charitable buildings, provided they are not used for military purposes. Spies and non-belligerents taking part in the war are entitled to no consideration. The property, other than the arms, of prisoners of war must be respected, and they are entitled to be fed and clothed. An army is not entitled to be regarded as in occupation of territory unless the occupation is actual and physical, and in such a case devastation is only justified by military necessity; and requisitions and contributions levied from the inhabitants must be proportioned to military needs. A war is terminated either by treaty or conquest. The latter must be complete before it is regarded as effective, and it must be accompanied by overt acts, such as a proclamation of annexation. After a conquest the conqueror succeeds to all the liabilities of the conquered. See W. E. Hall's *International Law* (5th ed. 1904); Calvo's *Le Droit International* (1887); Grotius's *De Jure Belli et Pacis* (ed. 1853); Oppenheim's *International Law* (1905); and Smith and Sibley's *International Law as interpreted during the Russo-Japanese War* (1905).

International Mercantile Marine Company. See ATLANTIC SHIPPING TRUST.

International Securities. See INTERBOURSE SECURITIES.

International Trade. The distinction between domestic and foreign trade is deeply rooted alike in popular and in scientific thought. Public opinion regards trade with other countries in a different way from that in which it looks at interchange between parts of the same country. The former appears to be a field in which the rivalries of nations have full play, each seeking to get the better of its opponents. The rapid growth of another country's foreign commerce is a subject of alarm, as being dangerous to national interest. The returns of imports and exports are supposed to need the watchful care of the state in order to secure benefit and ward off loss, while the changes in internal traffic pass comparatively unheeded. Economists also, though for totally different reasons, make a separation between home and foreign trade. Experience has shown that within a particular country labour and capital move, if not with perfect freedom, yet to such an extent as to establish a strong tendency towards equal remuneration for services of the same grade. On the other hand, these factors of production do not readily pass from one country to another. The causes of this hindrance are partly political, partly social and economic; but one result is unquestionably a decided divergence in rates of wages and profit between different nations.

The exchanges between two countries (*i.e.* between citizens of those countries) are determined by differences of need for the goods exchanged. The values of articles, or the terms on which they exchange, conform to the expense of producing them, and it is the difference of expense to different persons or nations that develops the system of exchange. Production becomes specialized, each producer taking the work in which he has an advantage. In the case of different countries this operation amounts to the growth of certain industries and the contraction or abandonment of others. The course of development conforms to what has been called 'the principle of comparative cost.' In order that countries may trade with each other, there must be a difference in the comparative, as distinct from the absolute, cost of production in respect to the articles that enter into the trade. Amongst the paradoxes of foreign trade, the case must undoubtedly be numbered in which a country with superior power imports from another inferior in all respects. But the strangeness disappears

in the light of the influence of comparative cost, since the superiority is not the same in all branches of production. Of like character is the difficulty felt at the failure of so many industries apparently perfectly suitable for a particular country. The greater comparative advantage of those industries that do flourish is the real explanation, as the very idea of suitability must include an estimate of the relative position of industries abroad.

The advantages resulting from foreign trade are most clearly realized by considering the growth of the system. At first only rare and much-needed articles—luxuries, and, in time of famine, food—are the subject of trade. Gradually, as cost of transport diminishes, fresh commodities are added to the list, until some countries receive even the bulk of their food supply from abroad, and, besides, most of the conveniences of life. This expansion, apparent in the course of British foreign trade, shows that through this means a nation obtains (1) articles which it could not produce at any cost, and (2) commodities which, if confined to home production, would be costly in the extreme, but are now procurable at moderate rates. Just as important as the foregoing is the benefit that results from the better organization of production. The strongest industries of the country have more capital and labour employed in them, and the economies of large production operate in their case. When, as in high agriculture and mining, increased output involves more than proportional cost, foreign trade relieves the strain in the most pressing cases by giving an outside supply. There are, moreover, the social and economical benefits that follow from the interchange of ideas and methods, that the close and constant intercourse of trade must produce. To deny their existence or their significance would be absurd.

One influence which retards the progress of trade between nations has been mentioned—cost of transport. Shipping freights and railway charges swallow up a part of the gain of exchange, and thus we see how a lowering in this element of cost opens a wider field for international commerce. It may be said that trade is ever pressing against the limits set by the cost of transport. Of exactly similar character is the charge imposed by tariffs. Duties have the effect of contracting the area for profitable exchange, as their removal has that of widening it. Duties for protection are specially operative in this way, since they do not affect home producers as a revenue duty does.

A very important problem connected with foreign trade is the allocation of its benefits amongst the several parties. A mass of difficult theory has been developed by English economists on this subject, but the leading points admit of fairly simple statement. First of all, it is plain that a country obtains its imports by means of its exports. The latter are thus the price paid for the former. Hence the cost of the exports is the real price of the imports. Next, we have to estimate the cost of the imports if they had to be produced at home, and (assuming this calculation possible) we obtain the amount of advantage. Then, by comparing these amounts for different countries, the relative gain would be ascertained. As already stated, such precise computation is impossible, as indeed it is unnecessary. It is quite enough to indicate the general conditions which determine the division. Of these, one is the comparative efficiency of industry: a country of great productive power evidently obtains its imports at lower cost than a country of inferior productiveness. The intensity of demand is a second condition. A nation that urgently needs the products of other nations must be prepared to give more for them than would be the case if its demand were feeble. In actual trade the combined demand of the several leading countries operates in a complicated way to fix the terms of exchange, so that the effect of intense demand by one nation is modified by that of others, just as the needs and productive power of the individual consumer and producer are absorbed in the wider area of the market. In this way each country may obtain special advantages of the nature partly of consumers' and partly of producers' rent, to use the technical language of modern economists.

Perhaps the greatest difficulty encountered in the study of international trade is that which arises from the action of money. This agent is the chief cause of the errors so prevalent on the subject. As transactions are generally expressed in terms of price, it is natural to regard the circulating medium as a primary influence on trade. But in all trade money is only an instrument, not a primary force. In domestic trade 'relative prices are adjusted to relative values, and this is equally true of trade between countries. In a sense foreign trade is even nearer to barter, since the precious metals in the form of 'bullion,...the money of the great mercantile republic' (Adam Smith), are really important commodities. Thus in

international trade there ought to be little trouble in seeing the true relations of money and goods; but popular prejudices, and the habit of regarding trade from the point of view of a single country, long prevented a proper analysis being made. It was reserved for Ricardo to show that the precious metals are distributed in such a way as to bring about the very results that would exist under a trade of barter, or, in other words, that the distribution of money is the result, not the cause, of the conditions of foreign trade. It may be added that the modern development of credit expedients makes the insignificance of money as an originating force still plainer. Fifty years ago the balances of international accounts were met by the transmission of bullion; now international securities are available for this purpose. The same consideration applies to the adjustment of prices. Formerly the corrective of unduly high or unduly low prices in a country was the export or import of bullion; at present the contraction or expansion of credit accomplishes the same end more effectually.

The variety of currency systems has been a further cause of confusion in respect to the true place of money. The working of foreign trade was regarded as essentially bound up with the relation of the several monetary systems as exemplified in the mechanism of *foreign exchange*. Here, again, a true analysis has established the subordinate place of money, in respect to exchange fluctuations, in contrast to the weightier influence of relative indebtedness. In the actual position of international commerce the relations of each country with other nations are of a complicated kind. It is, indeed, possible in the abstract to take the imports and exports of a month or year and present a kind of balance sheet of the country's trade. Such a statement is, however, necessarily incomplete. The imports of one period may be repaid by the exports of a succeeding one, or a given export may be in substance a loan of indefinite duration. A country with much accumulated wealth will probably have a part of its savings invested abroad. An extensive mercantile marine will earn profits from foreign traders. Even travel and political arrangements will contribute a quota to the total of international transactions, as they entail expense. So regarded, the trade of the world appears as a constant flow of commodities and services passing from country to country, and giving rise to corre-

sponding obligations running for periods of different length. In every country there is a 'capital' as well as a 'revenue' account in respect to foreign trade, and both have to be considered in order to ascertain its true situation. It is in connection with this 'capital' account that the use of securities, already referred to, becomes so important.

The immense complication of the system of foreign trade is certain not only to continue, but to increase. Some particular parts will from time to time decay, to be replaced by new developments. Judged by the test of 'values,' or the more accurate one of 'quantities,' over each long period there has been expansion. The trade of 1900 exceeds that of 1850 as much as the latter exceeded that of 1800. Nor is there any sign of diminution in the rate of growth. This is the more noticeable in the face of attempts to limit imports made by so many governments in their adoption of the policy of protection. Its explanation is found in the more than counteracting influences of cheaper transport and the development of new countries. It must also be remembered that modern tariffs, ostensibly protectionist, are, in a great degree framed for revenue purposes; and though they hamper trade, they are yet so devised as to allow a good deal of it to pass on paying toll. Again, only certain parts of trade are affected by tariff charges, and the remainder grows more rapidly in consequence.

Briefly stated, the criticisms directed against foreign trade are three in number. (1.) The territorial division of labour which follows from foreign trade leads to undue specialization, which is politically and economically injurious. One set of countries will be wholly agricultural, another will become purely manufacturing. The evil consequences of undue division of labour in the case of individuals will be repeated in that of nations. Such objectors overlook the fact that the smallest nation is sufficiently large to maintain several different employments under any circumstances. Some manufactures must exist in the rudest country. Agriculture may diminish, but will not die out, even where manufactures are most developed. Diversity may, it is possible, be increased in all countries by the subdivision of employments. (2.) Another objection is derived from the difficulty of securing due adjustment between supply and demand in the world-market that international trade creates. At best the balance is hard to maintain, but war or combinations

may, it is said, break up the existing system for a time, and thus cause terrible suffering and loss. England's dependence on other countries for her food supply and so much of the raw material of her industries is given as an example. This contention has the grave defect of not recognizing the necessity of the present situation. Arrest of foreign trade in the special case of England would mean the diminution of population and reduction of industries. The risk—a very remote one—is an essential incident of the admitted advantages. The truth rather is that such danger of dislocation as does exist can be most wisely met by further development, not by limitation, of international trade. In foreign, as in home trade, the wider the market the steadier the conditions. (3.) Admitting the economic advantages, some writers dwell on the political and moral evils of extended foreign trade. Growth of wealth and population, and absorption in industrial pursuits, disturb the political balance and bring about moral decline. In this argument there is an assumption as to the true character of society and its best line of development which can hardly be accepted. The real point of dispute is the claim of liberty against authority. The impugners of foreign trade are really inheritors of the socialist tradition of Plato, More, and Fichte: their complaint is not against foreign trade, but against the modern individualistic organization of society.

Adam Smith's *Wealth of Nations* (new ed. 1903, bk. iv. ch. 1-2) gives a broad exposition of the advantages of foreign trade. The more scientific doctrine is developed in Ricardo's *Principles of Political Economy* (new ed. 1891), ch. 7; J. S. Mill's *Essays on some Unsettled Questions* (2nd ed. 1874), Essay 1, and *Principles* (new ed. 1892), bk. iii. ch. 17-21; Cairnes's *Leading Principles* (new ed. 1884, pt. iii.). English textbooks of economics follow Mill in the main, but there are sundry modifications introduced, as in Sidgwick's *Principles* (1887), bk. ii. ch. 3; J. S. Nicholson's *Principles* (1903), bk. iii. ch. 25-28. Senior's *Three Lectures on the Cost of Obtaining Money* (1830) and Torrens's *The Budget* (1844) may be noticed. Special works are Bastable's *Theory of International Trade* (4th ed. 1903) and *Commerce of Nations* (1892). Rogers's *History of Agriculture and Prices* (1866-1902), Cunningham's *Growth of English Industry and Commerce* (4th ed. 1903-5) give details on the development of foreign trade. Taussig's *Tariff History of the United States* (1888)

illustrates admirably the working of principles. Two smaller books are the prize essays by Bowley—*England's Foreign Trade in the 19th Century* (1893)—and Chapman's *History of Trade between the United Kingdom and United States* (1899). The most important criticism of the English theory is Cournot's *Théorie des Richesses*, bk. iii. ch. 4-6. See also Edgeworth's articles in *Economic Journal*, vol. iv.; and Parliamentary Blue-books—e.g. *Annual Report on Trade of the U.K. with Foreign Countries and Statistical Abstract of the British Empire, 1889-1903* (1905). The references under FREE TRADE and PROTECTION will also serve here.

Interpleader, in English law, the process by which a person obtains relief when he is sued for a debt or goods in which he has no interest by two or more parties claiming against each other. The court gives directions as to how the action is to be conducted as between the parties claiming an interest. The procedure is regulated by Order LVII. of the Rules of the Supreme Court.

Interpolation, the mathematical method for calculating any required value of a varying quantity of which certain particular values are already tabulated. For example, in finding his position at sea the mariner has to use the numbers which determine the sun's position at the time he makes his observation. This time is given by his chronometer, and he finds the required numbers from the pages of the *Nautical Almanac*. But in the *Almanac* the sun's position is given only at regular successive intervals of time, none of which will, as a rule, correspond with the time of observation. He must, therefore, from the tabulated values at the nearest instants given in the *Almanac*, calculate the true values at the instant required. This is done by interpolation. But the simple method of interpolation is inaccurate when the successive differences vary rapidly in value. It is then necessary to consider the second and higher differences. The branch of mathematics which deals with this question is the calculus of finite differences, and it finds its most important applications in astronomy, the theory of annuities, and actuarial work generally. Interpolation may also be effected graphically.

Interpretation Act, 1890. This act provides that in all acts passed after certain dates, and in some cases in any act whatsoever, certain common expressions shall have certain definite meanings unless the contrary intention appears.

Interrex, an official of ancient Rome, who was appointed by the patres, or senators of patrician family, on the death of a king, or, in republican times, of a consul. The first interrex appointed named a successor; this second interrex might nominate the king or consul after consultation with the patres, though occasionally a third and even a fourth interrex was appointed. This nomination by the interrex kept up the fiction of personal selection of a successor by his predecessor, and was held to be necessary for the proper transference of the auspica, or religious power of king or consul. The interrex held power for five days, and had to be a patrician.

Interrogatories are written questions put, during an action, by one party to the other, which must be answered in writing, and upon oath. Their main object is to extract admissions from the person interrogated, in order to save the person interrogating from proving the facts. Interrogatories will be disallowed if they are irrelevant and unnecessary, prolix, oppressive, or scandalous. In Scotland, interrogatories have a different meaning. If a witness is proved on oath to be outside the jurisdiction, or too ill to attend, he may be examined on commission by interrogatories settled by the parties and approved by the clerk of the court. See also DISCOVERY.

Interval, in music, the difference between two notes of different pitch. The vibrational numbers which define the difference vary slightly according to the system upon which the calculations are based, but, except for purposes of theoretical demonstration, the nomenclature of intervals remains the same under various systems of tuning. The smallest interval used in practical music is a semitone, and in tempered intonation all semitones are of equal size. The modern chromatic scale consists of twelve consecutive notes of different pitch, which, beginning with the tonic or keynote, are each a semitone higher than the preceding note. All other scales are constructed from these twelve semitones. The number of semitones contained in the interval between two notes of different pitch determines the *size* of the interval, but the numerical name depends on the number of degrees of the scale included: thus, though the interval C to E contains four semitones, it is termed a third, because it includes only three degrees of the scale—*viz.* C, D, E. Intervals calculated upwards from the tonic to the other degrees of the major scale are *major* (seconds, thirds, sixths, and sevenths) and *perfect* (unisons,

fourths, fifths, and eighths). These may be increased or augmented by raising the higher note or depressing the lower note, and may be lessened by reversing the process. Major intervals lessened a semitone become minor; minor and perfect intervals lessened a semitone become diminished; and major and perfect intervals increased a semitone become augmented. When inverted (see INVERSION) perfect intervals remain perfect, but major become minor, augmented become diminished, and *vice versa*. Augmented thirds and sevenths and diminished seconds are not used in harmony. Intervals larger than an octave are termed *compound*—a second with its upper note an octave higher becoming a ninth, a third a tenth, etc. All intervals are either *consonant* or *dissonant*. Unisons, fourths, fifths, and eighths are *perfect* and *consonant* when in their primary relationship to the tonic or keynote of the major scale, but they become *imperfect* and *dissonant* when augmented or diminished. Major and minor seconds, major, minor, and diminished sevenths, are all dissonant; major and minor thirds and sixths are consonant, but when augmented or diminished become dissonant.

Intestacy. See DISTRIBUTION, STATUTES OF.

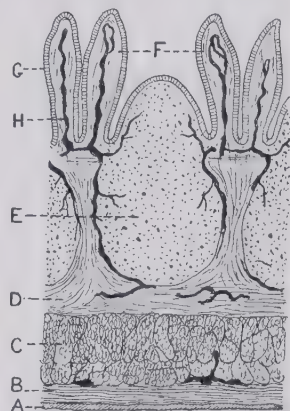
Intestines. The intestine, or bowel, is that part of the alimentary canal which, commencing at the pyloric end of the stomach, is coiled in the abdominal cavity and ends at the anus. Although a single continuous tube, it is divided into various parts for purposes of description. Food leaving the stomach passes first into the duodenum, thence into the jejunum, and later into the ileum. These three portions form the small intestine, which in man is about thirty feet in length. The opening of the ileum into the cæcum, the first part of the large bowel, is valvular, and this arrangement contributes to the onward passage of the intestinal contents. Beyond the ileo-cæcal valve the cæcum forms a blind dilatation, and from it springs an elongated blind process, the vermiform appendix, which is a rudiment of a much larger structure occurring in the lower mammals. The cæcum is continued upwards as the colon, which is described as (1) ascending, (2) transverse, and (3) descending. The sigmoid flexure lies between the descending colon and the rectum, whose lower opening, the anus, is guarded by a strong circular muscle, the sphincter ani. The intestines are covered by a serous membrane, the peritoneum, and are loosely

attached to the spine by the mesentery. Within the peritoneal covering are muscular and mucous coats. During life the muscular fibres exhibit peristaltic contraction, the upper fibres contracting before the lower, so that the intestinal contents are constantly pushed onwards by the wavelike narrowing of the active bowel. In the mucous coat are numerous glands which secrete the intestinal juices. Some of these glands are solitary, but in the small intestine many are aggregated to form patches (Peyer's glands). The intestinal secretions are augmented by those of the liver and pancreas, which have a common opening into the duodenum. The interior of the small intestine is characterized

Diseases.—The leading intestinal diseases are described elsewhere. But from the interdependence of different organs, the alimentary system is peculiarly prone to be deranged as a secondary result of disease elsewhere. Although the immediate nerve supply of the bowel is derived from the sympathetic system, that a close relationship exists between the alimentary tract and the central nervous system is evidenced by the frequency of headache, depression, irritability, and other mental symptoms which arise as the result of intestinal derangement. On the other hand, mental impressions frequently produce intestinal symptoms, such as diarrhoea, suppression of the normal secretions, generation of large quantities of flatus, or even ulceration. From their anatomical structure and relations, the intestines are liable to a special class of accidents which are largely the result of their mobility and muscularity. Thus, volvulus (twist), intussusception (invagination), and hernia (rupture) are frequent displacements; and numerous others are produced by the traction or by the pressure of other organs and of tumours, or by peritoneic inflammations. From the diversity of the tissues which form the intestinal wall, the bowel is subject to the development of numerous varieties of new growth, many of which are malignant. Inflammatory conditions of the bowel are common, and present many types. Enteritis may be acute or chronic, and it may affect the whole bowel, but is more often localized, in which case such a name as typhlitis, duodenitis, ileitis, or colitis is used to designate the part affected. Appendicitis may result from the impaction of a foreign body, or from the irritation of a concretion of its own, and inflammation in this site is specially liable to lead to abscess formation around the bowel. In other cases intestinal inflammation may terminate in ulceration, which may also be a consequence of new growths, and of the specific poisons of diseases like tubercle, dysentery, and enteric fever. A peculiar ulceration of the bowel follows extensive burns of the skin, and may be due to nervous shock. Ulceration may lead to severe hæmorrhage, and to perforation of the bowel. Intestinal obstruction may be produced by malformation (congenital), by internal or external strangulation of the gut, by the impaction of gall-stones, foreign bodies, or faecal accumulations, by constriction of the bowel through cicatricial contractions or new

growths, and by the compression of tumours or displaced viscera.

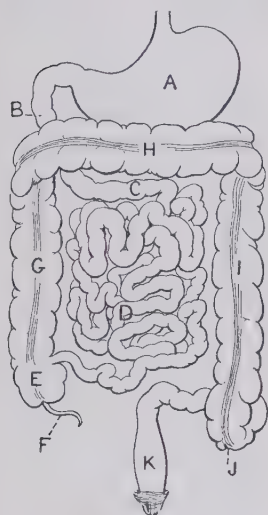
Symptoms.—Pain is generally the first symptom of intestinal



Section of Wall of Intestine, through a Peyer's Patch.

A, Peritoneal layer; B, longitudinal muscular layer; C, circular muscular layer; D, mucous layer; E, lymphoid follicle; F, villi; G, epithelium; H, lymphatics.

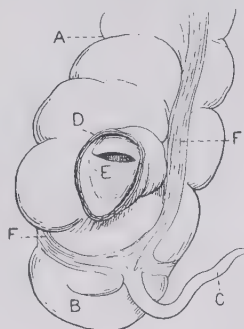
disease, and it is often of a characteristic griping or colicky nature. It is sometimes accompanied by tenesmus, or straining. Vomiting practically always occurs, and is frequently repeated in intestinal obstruction, and after a time the vomited matter may be faecal in character. Constipation is both a cause and a result of many diseases of the bowel. The local irritation of faecal masses may produce hæmorrhoids or ulceration, and when hardened faeces become impacted they may cause serious obstruction. Abdominal



General Diagram of the Intestines.

A, Stomach; B, duodenum; C, jejunum; D, ileum; E, caecum; F, vermiform appendix; G, ascending colon; H, transverse colon; I, descending colon; J, sigmoid flexure; K, rectum.

by the presence of villi, which are minute projections into the lumen of the bowel. Each villus is covered by mucous membrane, and contains the commencement of a lacteal vessel, by means of which digested food is absorbed and transmitted through the lacteals to the blood stream. Some of the material absorbed passes to the liver by the portal vein. (See DIGESTION.) The large intestine contains no villi. The bowel is abundantly supplied with blood and lymph vessels, which reach it through the mesentery, and the intestinal nerves are derived from the sympathetic system. The processes of intestinal digestion will be found described at DIGESTION.



The Caecum.

A, Colon; B, caecum; C, vermiform appendix; D, transverse section of small intestine; E, ileo-caecal valve; F, muscular band.

swelling and tenderness are generally present in inflammatory conditions of the bowels, and they are often manifested by the rigidity of the abdominal

muscles, and by the attitude of the patient, who keeps his thighs flexed on the abdomen. When tenderness and swelling are localized, they are useful diagnostic guides. Diarrhœa is a common result of intestinal disorders of every type. It should always be remembered that diarrhœa may be due to obstruction, or to the irritation of hard fecal masses; that it is, in short, often a symptom of constipation. When blood is shed in the lower part of the bowel, it retains its normal colour; but if poured out in the stomach or in the higher parts of the intestine, it is decomposed by the digestive secretions, and the stools have a black, tarry appearance. Hemorrhage may be the result of ulceration or of vascular growths in the bowel, or it may be caused by such blood diseases as leucocythæmia and purpura hæmorrhagica. When the intestinal vessels are much engorged, moderate hæmorrhage may be beneficial. Intestinal obstruction high up is generally marked by diminution in the secretion of urine, or even by suppression. This symptom invariably occurs in collapse, which is apt to come on in the graver forms of intestinal disease. Collapse may appear at the onset of acute obstructive conditions, or may immediately precede a fatal result. In the former case it is due to shock, such as is caused by the sudden impaction of a gall-stone or a foreign body. When it develops later, collapse may point to rupture of the bowel or to severe hæmorrhage. In children convulsions are a very common symptom of intestinal derangement, and a considerable proportion of fits occurring in childhood is due to intestinal parasites, and to the irritation of the bowel by indigestible food.

Treatment.—Treatment of intestinal derangement may be either expectant or active. In many of the slighter disorders it is sufficient to procure physiological rest of the bowel, so far as that may be done by a moderate degree of starvation, or by giving a limited supply of foods which are easily absorbed. When it is necessary to keep the upper part of the bowel at rest, feeding may be carried on by nutrient suppositories and enemata, only a little ice or water being administered by the mouth. All sources of irritation, such as indigestible or fermenting food, parasites, and hardened feces, should be removed from the bowel by purgatives, by anthelmintics, or by enemata. Pain may be controlled by hot fomentations, by turpentine stupes,

or by opium, which, however, should almost never be given to children. Counter-irritation and the application of ice to the abdomen are both of service in many inflammatory and painful conditions. In the graver intestinal diseases more active measures must be adopted. When the bowel is strangulated, or when suppuration has taken place, every moment is of value, as the earlier such conditions are remedied by surgical interference, the better is the patient's chance of recovery. In all intestinal diseases the administration of opium by the mouth is attended by the risk that, instead of being absorbed by the diseased viscus, the drug may accumulate in the bowel, and lead to symptoms of poisoning should absorption recommence. Hypodermic injections of morphine are therefore generally preferable to pills or tinctures of opium. Ulceration of the bowel calls for physiological rest so far as that may be secured without detriment to the general health. Bismuth and other astringents may be given with benefit in simple ulceration. When the condition is tubercular, the prognosis is more grave and the treatment more difficult.

Intimidation of Witnesses. See EMBRACERY.

Intonation, in plain song, the two or more notes leading up to the dominant or reciting tone of a chant or melody, and usually sung by only one or a few voices. It is generally confined to the first verse of each psalm or canticle, but in singing the *Magnificat*, *Benedictus*, and *Venite* the priest or chorister sometimes sings the opening phrase of each successive verse. The Gregorian chant was compiled by Gregory the Great about A.D. 600.

Intoning, the uttering of the Anglican liturgy in musical recitative. This may be either in monotone, or more usually with harmonized inflections. The rubrics direct that several parts of the prayers shall be 'sung or said,' and singing is now almost universal, except where choirs are not to be obtained. The service was harmonized by Tallis (c. 1560), and his rendering is that still most commonly used. See Doran and Nottingham's *Choir Directory of Plain-song*.

Intoxication. In a scientific sense intoxication may be produced by various poisons, such as chloroform, ether, opium, etc., but the term is popularly restricted to the temporary effect of overdoses of alcohol. The symptoms are essentially due to the action of alcohol upon the central nervous system, and they vary with the individual, with the form of the alcohol, and

with the amount taken. Since alcohol acts most readily upon the cerebrum, or thinking part of the brain, the higher nervous centres are the first to be affected. After temporary stimulation and excitement the powers of volition and perception are blunted, so that intoxication may advance from unusual liveliness in movement, speech, and thought to a comatose condition, in which consciousness is lost and the intoxicated person lies like a log, with respiration and circulation so depressed as to endanger life. The more diffusible the stimulant, the more quickly does it act; thus a hot drink is more rapidly intoxicating than a cold one, and effervescing or sparkling forms of alcohol, like champagne, are rapidly absorbed and rapidly eliminated. Intoxication also ensues more easily when alcohol is introduced into an empty stomach. In some disorders again, especially such as are attended by high temperature, a large quantity of alcohol may be taken without intoxicating effects, probably on account of the rapid oxidation and elimination of the poison. The lower forms of alcohol, such as amylic, are the most harmful to mind and body. These are present in large proportion in unmatured spirits. Intoxication caused by other agents than alcohol generally produces similar results—viz. an initial exhilaration, followed by blunting of the higher faculties and subsequent depression of the vital nerve centres. The symptoms are caused partly by dilatation of the cerebral blood-vessels, and partly by the direct effect of alcohol on the brain cells. The preliminary exaltation is chiefly due to the increased blood supply of the brain, while the graver degrees of intoxication may be referred to the toxic action of alcohol on the nerve cells. See ALCOHOLISM and POISONS.

Intra, busy tn., prov. Novara, Italy, on w. shore of Lago Maggiore, 35 m. N. of Novara; carries on silk, cotton, and felt manufactures, and has iron works. Pop. (1901) 6,924.

Intransigents (lit. 'irreconcilables'), extreme political sections—e.g. the radicals and republicans who fomented an unsuccessful insurrection in Spain in 1873, the extreme left in the present Spanish Cortes, and the advanced radicals in France and Italy. The term had been used in Paris before this at the time of the Commune.

Intrepid, a British second-class cruiser (3,600 tons), launched in 1891. Since 1747 there have been in the navy men-of-war of this name.

Introduction, in music, is a preliminary section which frequently precedes various forms of musical composition and is almost invariably present in overtures. It may consist of a single chord or of a succession of chords, or it may contain a number of passages either differing entirely from, or somewhat similar in nature to, what follows. It may also be in the form and dimensions of a complete movement, either showing no relation to, or foreshadowing the character of, or having its subject-matter incorporated with, the succeeding composition. Beethoven made frequent use of the larger forms, and the introductions to several of his symphonies, quartets, sonatas, etc., approach in interest and value the works which they precede. In some of the earlier operas—*Don Giovanni*, *Der Freischütz*, *Norma*, etc.—the whole of the first scene was termed an introduction.

Introit, the verse, psalm, or hymn which is sung as the priest goes up to the altar. It consists in the Roman Catholic Church of an antiphon, gloria, and part of a psalm or other passage of Scripture. Being sung as the priest enters within the precincts of the altar, it was named the *Introitus*. Introits are ascribed to Gregory the Great, or even to Celestine (423). Introits were provided in the first English Prayer Book of King Edward VI. (1549).

Intromission, a term of Scots law signifying the action of a person who assumes the possession or management of property of another. If he is legally authorized or entitled to do this, as in the case of a judicial factor or an executor, his dealings with the property are legal intromissions. If he acts without authority, as when any one who is not appointed executor or administrator interferes with property of a deceased person, his dealings are called 'vitious intromissions.'

Intuition, in its most general sense, signifies immediate perception or insight, as contrasted with discursive reasoning. From this two special meanings branch out, according as we refer to (1) an immediate knowledge below the level of reasoning (*viz.* direct perception by the senses), or (2) an immediate knowledge above the level of reasoning (*viz.* insight into those fundamental and self-evident truths which, so far from requiring to be proved by reasoning, are themselves the basis of all reasoning and proof)—as, for example, the axioms that every event must have a cause, and that the same cause will have the same effect (uniformity of nature). Intuition in the former sense has

been very generally used as the equivalent of *Anschauung* in the Kantian theory of knowledge. But the word is far more frequently used in the second sense; and 'intuitionism' is used in this sense as the designation for the view, alike in theory of knowledge and in ethics, that certain self-evident axioms are presupposed as the basis of all reasoning and reasoned knowledge, whether speculative or moral. For intuitionism in theory of knowledge generally, see SCOTTISH PHILOSOPHY; and for intuitionism in ethics, the discussion in Sidgwick's *Methods of Ethics*, bk. iii. (6th ed. 1901), also references in his *Hist. of Ethics* (3rd ed. 1892).

Intussusception, or INVAGINATION, results when one part of the intestine passes in telescopic fashion into the part immediately adjoining. The condition leads to obstruction of the bowels, and may cause acute colicky pain, with sickness and diarrhœa, accompanied by tenesmus. The evacuations and vomit are frequently stained with blood, and convulsions often occur in children. The condition is most frequent in children, and is a common cause of death in infants under one year old. The immediate cause seems to be peristaltic irregularity, whereby one part of the bowel is active while a neighbouring part is inert. Sometimes the condition follows diarrhœa with severe straining; occasionally it is associated with the presence of parasites and undigested food; and at other times it depends on the pressure or traction of a new growth. Almost any part of the bowel may be the site of intussusception, but most frequently the ileum and cæcum pass into the colon. Sooner or later, if the condition remain unrelieved, the included part becomes gangrenous, and death may follow either rapidly from shock or later from peritonitis. Recovery may take place by the formation of adhesions at the part where the inner layers of the intussuscepted bowel enter the outer portion. The whole mass included may then slough away, and be passed by the rectum. Several feet of bowel have been evacuated in this way, but unfortunately the process is very rare in children.

Treatment.—Prompt and active surgical interference is generally imperative. Purgatives can only increase the mischief. A copious enema of oil may be gently and slowly introduced, the child's body being inverted, and abdominal taxis being employed, in the hope that the entering bowel may thus be forced backwards. Should this procedure fail, the abdomen should be opened, and

the intussusception reduced by gentle traction and manipulation. The operation should be performed before there has been time for peritonitic adhesions to form or for gangrene to set in.

Inula, a genus of hardy herbaceous plants of the order Compositæ. Their flowers have an imbricated, hemispherical involucre; a flat, naked receptacle; yellow flower-heads; and a hairy pappus. *I. Helenium*, the elecampane, a British species, is a tall plant, with large oval, downy leaves and large flowers. *I. Conyza*, the 'ploughman's spikenard,' is an inhabitant of British hedgerows. From the roots and tubers of this genus is obtained inulin ($C_6H_{10}O_5$)_n, a compound like starch. It is a tasteless white powder which is converted into levulose on heating with dilute acids.

Invalides, HÔTEL DES. See PARIS.

Invasion. When the territory of a state is invaded by a foreign army, the legal rights conferred on the invader by international law are limited to the rights of military occupation, and must not be confused with the rights conferred by conquest. The extent and nature of the rights conferred by military occupation have given rise to much controversy, but the modern view is that the rights of an invader are limited to doing such acts as are required for his safety and necessary for the purpose of bringing the war to a successful conclusion. The national character of the territory and people invaded remains unchanged. The fundamental institutions and the general laws affecting property and private personal relations are not altered. But the invader nevertheless temporarily assumes absolute authority to do what is necessary to protect his army and attain his end. If he exceeds these limits his acts have no legal effect when the occupation comes to an end. Because of the absolute authority temporarily assumed by an invader, it is his duty to secure public order; and because of the limited nature of his rights, it is his duty to refrain from doing wanton damage.

Conquest involves occupation, but goes far beyond it, and includes the appropriation of territory, the assertion of sovereignty over it, and the proof of ability to keep it. The conquest may be recognized by the terms of a treaty of peace, or undisputed possession coupled with the exercise of sovereignty for a reasonable time, varying with the circumstances of each case, may be admitted as sufficient proof.

Inventions, PROTECTION OF. See PATENTS.

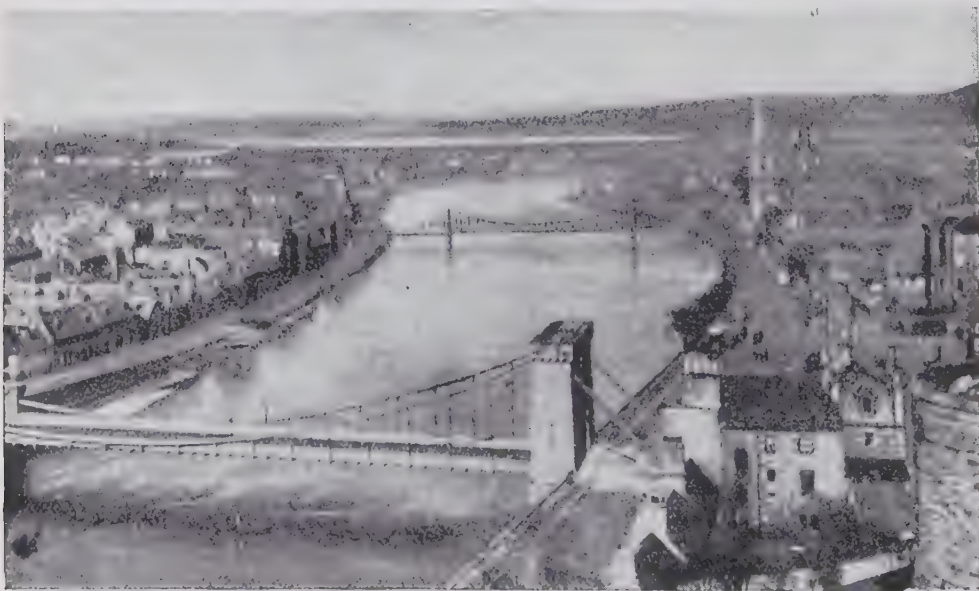
Inventory, a list of personal property, including choses in action, which is required in England under the Bills of Sale Acts, and of executors and administrators. In Scots law the word is used in several connections. An inventory of process, an inventory of documents, and an inventory of title deeds, are lists of documents made up for the purposes of various legal proceedings. A tutorial or curatorial inventory is a list of the property of a pupil or minor, or an insane person, prepared by the tutor or curator.

Inventory Duty, the stamp duty payable in Scotland in respect of the movable estate of persons who died prior to Aug. 2,

Inverclyde, **BARON (SIR JOHN BURNS, 1829-1901)**, first Baron Inverclyde, educated at Glasgow University, and afterwards became associated with the Cunard Steamship Company, of which his father was one of the three founders. On the retirement of the original partners, he became head of the firm. Besides his connection with the Cunard Line, Lord Inverclyde was actively interested in the service between Glasgow and Ireland. He was made a peer in 1897. Among his writings were *The Adaptation of Merchant Steamships for War Purposes*, *Something About the Cunard Line*, *A Wild Night*, and *Glimpses of Glasgow Low Life*.—His son, **GEORGE ARBUTH-**

N.E. of Fort William, was the scene of the defeat of Argyll by the Marquis of Montrose on Feb. 2, 1645. See *Scott's Legend of Montrose*.

Inverness, parl. and royal bur., mrkt. and co. tn., seapt., Inverness-shire, Scotland, 108 m. W.N.W. of Aberdeen, is beautifully situated near the mouth of the river Ness, and at the junction of the Beaulieu and Moray Firths. It is frequently called the 'capital of the Highlands.' The Caledonian Canal passes about a mile from the town. The buildings include the episcopal cathedral and the county lunatic asylum. The curiously-shaped hill of Tomnahurich has been laid out as a cemetery. The chief industries



The town of Inverness and the river Ness.

1894. From that date it is superseded by estate duty. See **DEATH DUTIES**.

Inveraray, royal and parl. bur., and co. tn. of Argyllshire, Scotland, on N.W. shore of Loch Fyne, 45 m. N.N.W. of Greenock. About half a mile to the N.W. is Inveraray Castle, the seat of the dukes of Argyll, built in 1744-61, partly burnt in 1877, and rebuilt in 1880. Pop. (1901) 739.

Invercargill, tn. of Otago, New Zealand, on New R. estuary, 17 m. inland from its port (the Bluff), and 139 m. S.W. of Dunedin. It is the usual starting point for Southern Lakes. Its chief industries include breweries, foundries, flour mills, and sawmills. Pop. (1901) 9,945.

NOT BURNS (1861-1905), second baron, served for some time as Lord Dean of Guild of the city of Glasgow, and succeeded his father as chairman of the Cunard Steamship Company.

Inverell, tn. of Gough co., on Macintyre R., New South Wales, Australia, 341 m. N. of Sydney. Vines are largely grown. There are tin and diamond mines in the vicinity. Pop. of tn. (1901) 3,295.

Inverkeithing, par. of S.W. Fifeshire, Scotland, and parl. and royal bur. (since 12th century), 2 m. N. of the Forth Bridge. The town forms one of the Stirling group of burghs. Pop. (1901) 1,965.

Inverlochy, ruined castle, Inverness-shire, Scotland, 2 m.

are shipbuilding, brewing, distilling, iron founding, and the manufacture of woollen goods. The town, along with Forres, Fortrose, and Nairn, returns one member to the House of Commons. A large wool fair is held in July. Pop. (1901) 23,066.

Inverness-shire, a maritime Highland co., Scotland, stretching from the Moray Firth to the Atlantic Ocean. It is the largest county in Scotland. It has an area of 4,323 sq. m., and embraces also, in the Outer Hebrides, Harris, N. and S. Uist, Benbecula, Barra, etc.; and, in the Inner Hebrides, Skye, Raasay, Scalpay, Eigg, etc. The mainland is divided into two sections by Glenmore, through which runs the

Caledonian Canal, connecting Loch Linnhe and Beaully Firth. The surface is extremely mountainous. Among the loftiest summits are Ben Nevis (4,406 ft.)—the highest peak in Great Britain—Brearich (4,248 ft.), Cairngorm (4,084 ft.). The chief rivers are the Spey, the Ness, and the Beaully. Among the more important lakes are Lochs Ness, Oich, and Lochy in the course of the Caledonian Canal, Eriacht and Laggan in the s., Shiel in the w., Eil and Arkaig to the w. of the Caledonian Canal. On the w. coast are the openings of Lochs Hourn, Nevis, and Moidart. Striking traces of glacial action are found in the terraces of Glen

Invertebrates, a general term applicable to all animals not possessing that combination of characters which distinguishes the members of the vertebrate series. No invertebrate possesses a notochord, nor has it gill-slits; the heart, if present, is dorsal in position, and the major part of the nervous system usually ventral; the nervous system does not, as in vertebrates, develop as a hollow tube; and the eye is not an outgrowth of the central nervous system. The chief divisions of invertebrates are the Protozoa; Porifera, or sponges; Coelentera; unsegmented worms; Annelids, or segmented worms; Echinodermata; Arthropoda, including Crustacea,

office, or benefice, with the ceremonial delivery of some symbol of the rights conferred. Temporal sovereigns claimed the right of investing bishops with the temporalities of their sees by the giving of staff and ring—a right which, after a bitter struggle between the pope and the emperor during the 11th and 12th centuries, was at length successfully resisted by the popes. At the concordat of Worms (1122), the Emperor Henry V. agreed to confer investiture by the touch of the sceptre only, thus not implying the conferring of spiritual powers.

Investors' Review, THE, was founded in 1892 by Mr. A. J.



Roy. About five and a half per cent. of the county is under cultivation, but the greater part is covered with deer forests and moor. Sheep-farming is extensively carried on. The most important industry on the w. coast is herring-fishing. Chief town is Inverness. The county returns one member to the House of Commons. Pop. (1901) 90,104.

Inversion, in music, has various meanings. Inversion in a chord means that some note other than the root note of a chord is in the lowest position. Inversion of parts signifies that a passage in counterpoint is repeated with the intervals reversed, or has a part transposed higher or lower. See INTERVAL.

Insecta, and Arachnida; Mollusca.

Invert sugar is the mixture of dextrose and levulose, prepared by heating cane sugar with dilute acids. It is readily fermentable, reduces Fehling's solution, and is used in the preparation of sparkling wines.

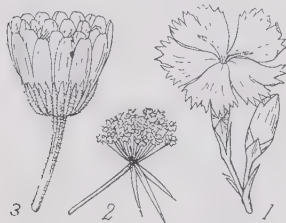
Inverurie, roy. and parl. bur., Aberdeenshire, Scotland, at the confluence of the Urie and Don, 16 m. N.W. of Aberdeen; it manufactures paper. The G.N.S.R. workshops are situated here. The burgh forms one of the Elgin group of parliamentary burghs. Pop. (1901) 3,624.

Investiture, in feudal and ecclesiastical law, is the act of giving possession of a manor,

Wilson as a fiveshilling quarterly magazine. In January 1894 the *Review* was converted into a shilling monthly publication, and four years later it was changed to its present form, that of a sixpenny weekly. Through all these changes the *Investors' Review* has remained under the editorship, and latterly it has passed into the sole proprietorship, of Mr. A. J. Wilson.

Invincibles, Irish secret society of assassins, made up of some of the most desperate members of the Fenian associations. The object of the Invincibles was the assassination of officials, and, among other crimes, they were responsible for the Phoenix Park murders (1882).

Involucre, a whorl or verticil of bracts arranged round the base of an umbel or capitulum or of a single flower. The pink, fool's parsley, and marigold are examples.



Forms of Involucre.

1. Pink. 2. Fool's parsley (partial invol.). 3. Marigold.

Involution, an arithmetical and algebraic operation, which consists in raising a quantity to any given power. The inverse operation, or the extraction of a root, is called evolution. The distinction is of importance in arithmetic; but in algebra the two operations are included in the general method of indices, integral and fractional. When the power or index is a whole number, the process of involution gives one quantity from each given quantity. Thus, 10^2 is 100, and there is no other quantity. On the other hand, the extraction of a root gives algebraically more than one quantity. Thus the square root of four is either +2 or -2. Generally there are n different values of the n th root of a given quantity. Thus, to find the cube root of unity is to solve the equation $x^3 - 1 = 0$, and the three values are

$$1, \frac{-1 - \sqrt{-3}}{2}, \frac{-1 + \sqrt{-3}}{2},$$

the last two being imaginary.

Involution has also an important meaning in projective geometry, two systems of points being said to be in involution when they have a one-to-one correspondence fulfilling certain mutual relations. See Salmon's *Conic Sections* (6th ed. 1879), and *Geometry of Three Dimensions* (4th ed. 1882).

Io, the daughter of Inachus, first king of Argos, according to ancient Greek legend. She was beloved by Zeus, whose wife, Hera, in jealousy, turned her into a heifer, and set the hundred-eyed Argus to watch her; but the latter was slain by Hermes at the command of Zeus. Hera then sent a gad-fly to torment Io, which drove her from land to land, until she reached Egypt, when she regained her true shape, and bore a son, Epaphus. According to the tradition, the Bosphorus, which means Ox-ford, got its name

from her crossing it. Io appears to be identical with the moon-goddess. The fullest account of her wanderings is given in *Æschylus's Prometheus Vinctus*.

Iocasta. See **EDIPUS**.

Iodic Acid, HIO_3 , is obtained by the oxidation of iodine by heating with concentrated nitric acid, and is a colourless, crystalline solid that dissolves in water. It loses water, and is converted into iodine pentoxide on gentle heating, decomposing into iodine and oxygen at a higher temperature. It is acid to litmus, forming a series of salts, the iodates, of which sodium iodate, occurring in caliche, is the principal. This is the chief source of iodine. Iodic acid and the iodates are easily reduced to iodine.

Iodine, I, 126.97, is an element of the halogen group. It occurs as iodide in sea water, from which it is collected by seaweeds. Those, such as *Laminaria digitata* and *L. stenophylla*, growing below low-water mark, contain the most, up to about 0.5 per cent. It is chiefly prepared, however, from the S. American nitrate or caliche, in which it occurs as sodium iodate, up to about 0.2 per cent. In preparing it from seaweed, that substance, or more usually its ashes (kelp), is boiled with water, so that the soluble salts, including the iodide, are extracted. The latter salt is by far the most soluble; hence, on boiling down the solution, the others separate out first, and are fished out. The liquid left, containing the iodide, is mixed with sulphuric acid, and put into a still, manganese dioxide being added from time to time to displace the iodine, which distils over, and is condensed in a series of earthenware receivers, or aludels. In the preparation from caliche, the mother liquors, from which the sodium nitrate has as far as possible been separated by crystallization, are heated with sodium hydrogen sulphite, prepared by passing the fumes of burning sulphur into crude sodium carbonate solution. As a result, iodine is set free, and separates in the solid form. This is washed, pressed, dried, and, as in the case of iodine prepared from seaweed, purified by sublimation. More iodine can be prepared from caliche than there is a demand for; hence the price is maintained by limiting the output. Iodine is a lustrous black crystalline solid of sp. gr. 5.0 that readily volatilizes into a blue-violet gas with a very irritating smell. At ordinary pressure iodine sublimes without melting, but at slightly greater pressures than atmospheric it melts at 114°C . It is but slightly soluble in water, but dissolves more freely in alco-

hol, and especially in potassium iodide solution, forming a brown solution in each case. Iodine also dissolves freely in carbon disulphide, chloroform, etc., in which solvents the solution is purple. Though active chemically, iodine is the least so of the halogens. Thus, though it readily unites with many metals, phosphorus, etc., it only combines partially with hydrogen when heated with it, has little or no action on hydrocarbons, or bleaching effect. It stains the skin yellow, and is easily recognized by the intense blue colour it gives with starch. Iodine is employed for the preparation of its compounds and of aniline colours, and also in medicine for external application as a counter-irritant and antiparastic. See **HYDRIODIC ACID**.

Iodoform, tri-iodo methane, CHI_3 , is best prepared by adding slight excess of a dilute solution of sodium hypochlorite to a solution of 50 grams potassium iodide, 6 grams acetone, and 2 grams sodium hydroxide, dissolved in about $1\frac{1}{2}$ litres of water. Iodoform is a pale yellow, peculiarly smelling, crystalline solid; m.p. 119°C . It is slightly soluble in water, and is antiseptic and disinfectant. It is largely used in medicine as an application for wounds, sores, and ulcers.

Iola, city, Kansas, U.S.A., co. seat of Allen co., 85 m. S. of Topeka. It has wells of natural gas, zinc works, etc. Pop. (1900) 5,791.

Iolaus, in Greek legend, the nephew and faithful attendant and charioteer of Hercules. When Eurystheus made war against the sons of Hercules, the gods of the lower world permitted Iolaus to return to the upper world to fight for them, and he killed Eurystheus.

Iolite. See **CORDIERITE**.

Ion. (1.) In ancient Greek legend, the ancestor of the Ionian branch of the Greek race. (2.) One of the lesser Attic tragedians; was a native of Chios, but lived at Athens, and flourished between 450 and 422 B.C. Only fragments of his tragedies survive; he appears to have been regular in style, and witty, but without any real greatness. He also wrote lyrics, epigrams, hymns, and even comedies; also prose works, of which the best known was the *Memoirs*, which described his famous contemporaries. (3.) In chemistry, see **IONS**.

Iona, an isl. and *quoad sacra* par. in the Inner Hebrides, Argyllshire, Scotland, $1\frac{1}{2}$ m. W. of the Ross of Mull. It is about $3\frac{1}{2}$ m. long, by $1\frac{1}{2}$ m. broad. Hi, Hii, Ieoa, and Icolmkill are some of the names by which the island has also at various times been known. In 563 Columba and

twelve disciples landed from Ireland, and founded a monastery and church. In 802 these were burned by the Danes, but rebuilt in 812 on the present site. The monastery was rebuilt and endowed by Queen Margaret of Scotland. Reginald, Lord of the Isles, in 1203 founded here a Benedictine monastery. The abbey church of St. Mary, afterwards the cathedral, was begun in the 12th century. To the s.w. of the abbey is the burial-place, containing tombs of Scottish kings before Malcolm Canmore, besides those of four Irish and eight Norwegian kings. The ecclesiastical ruins were bequeathed by the eighth Duke of Argyll to the Church of Scotland, and the cathedral was restored, and was reopened for public service in July 1905. Pop. (1901) 213.



Iona Cathedral: now partially restored.

Ionia, city, cap. of Ionia co., Michigan, U.S.A., on Grand R., 34 m. E. of Grand Rapids; has iron foundries, flour mills, and furniture factories. Pop. (1900) 5,209.

Ionia, that part of the w. coast of Asia Minor which was colonized mainly by settlers from Athens and others dispossessed by the Dorian invaders, probably in the 11th and 10th centuries B.C. In historical times there were twelve important cities which claimed to be Ionian, and formed a confederacy—Miletus, Myus, Priene, Samos, Ephesus, Colophon, Lebedus, Teos, Erythra, Chios, Clazomenae, and Phocæa; Smyrna (of Æolic origin) was afterwards added to the league. Their common sanctuary was a temple of Poseidon on the promontory of Mycale, called the Panionium, where the national assembly was held. During the 8th, 7th, and 6th centuries B.C. Ionia was the most advanced and most prosper-

ous part of Greece; its colonists settled largely especially on the Propontis and the Euxine; and it was in Ionia that philosophy, science, and history arose, and many famous poets were born. The Ionians were conquered by Croesus about 560 B.C.; then by Harpagus, general of Cyrus, in 545; in 500-499 they revolted from the Persians, but were again subdued in 494. The defeat of Xerxes left them free to join Athens in a league, in which eventually they became her subjects; this league was formed in 476, and dissolved by the defeat of Athens in the Peloponnesian war in 404. Thereafter, except for a renewal of the alliance with Athens from 378 to 357 B.C., the Ionian cities were autonomous, until they became merged in the kingdom of Alexander and his suc-

sively held sway, till, in 1809-15, the islands came under British protection. They were ceded to Greece in 1864. Pop. over 260,000.

Ionian Sea, that part of the Mediterranean which lies between Italy and Greece, s. of the Adriatic.

Ions was the term given by Faraday to the components of chemical compounds set free by electrolysis, being distinguished as anions when set free at the positive pole, and kations if at the negative pole. They are now believed to exist as such in electrolytic solutions, and differ from the material as ordinarily occurring by being powerfully charged with electricity; thus, a solution of hydrochloric acid is believed to contain chlorine and hydrogen ions disconnected from each other, but having quite different properties from chlorine and hydrogen gases, because existing as single atoms charged with electricity, instead of, as ordinarily, as electrically neutral molecules. When, in electrolysis, charged electrodes are introduced into such a solution, the ions are discharged, and assume their ordinary properties. See SOLUTIONS, ELECTROLYSIS, ELECTRO-CHEMISTRY.

Iota. See CAFFYN, KATHLEEN MANNINGTON.

I.O.U., a written acknowledgment of a debt in which the letters *I.O.U.* are by custom used for the words *I owe you*. The common form is: 'To Mr. A. B., I.O.U. £20.—C. D., Jan. 1st, 1904.' An I.O.U. contains no promise to pay. It is not a negotiable instrument, and requires no stamp, but it is good evidence of an account stated between the parties, though not of money lent. See Chalmers on *Bills of Exchange* (1896).

Iowa, one of the United States of America; was organized as a territory in 1838, and admitted as a state in 1845. Its present area is 56,025 sq. m. Iowa is a typical prairie state, with an undulating surface, sloping from the N.W. (1,500 ft.) to the S.E. (500 ft.). On the E. flows the Mississippi, and on the w. the Missouri. The principal streams within the state are the Des Moines, Iowa, and Cedar, all of them branches of the Mississippi. Iowa is pre-eminently a farming state, the chief productions being flour, cheese, butter, condensed milk, and packed and preserved meats. Of mineral products the state produces bituminous coal, lead, and zinc. The population in 1900 was 2,231,853. The density of population was 40 to a square mile, and the proportion of urban population was 17 per cent. Des Moines is the capital.

cessors. Eventually they passed under Roman rule, by which time some of them were in a languishing condition; they formed part of the empire of the east, and have now for centuries been under Turkish dominion.

Ionian Islands, an irregular chain of islands (area 1,100 sq. m.), extending along the w. coast of Turkey and Greece. The islands include Cerigo (s.e. of Morea), Coreyra or Corfu (the most important), Paxo, Santa Maura or Leukas, Ithaca (of the *Odyssey*), Cephalonia (the largest), and Zante. (See separate articles.) They are generally mountainous, with plains and valleys of exceptional fertility, yielding grain and fruit, particularly currants. The towns lie mostly along the E. coasts; many of the inhabitants are engaged in shipbuilding or in commerce. Corfu exports olive oil. Hellenic, Byzantine (till 1081), Venetian (1386-1797), French, and Russian rule succe-

Iowa City, city, Iowa, U.S.A., co. seat of Johnson co., 120 m. E. of Des Moines, and on the Iowa R. The state university is situated here. Pop. (1900) 7,987.

Ipecacuanha is a plant (*Psychotria Ipecacuanha*, of the order Rubiaceae) that is indigenous to the damp, shady forests of Brazil, and consists of a slender, prostrate stem bearing a few lanceolate leaves, and with numerous fibrous roots, some of which become abnormally thickened in the bark. The root is easily distinguished by the closely-packed, disc-like annulations, strung upon a firm and compact woody cord; it is hard,

acts as an emetic, and is almost a specific remedy in dysentery.

Ipek (Serv. Pec), tn., European Turkey, on a head-stream of the Drin, in the vilayet of Kosovo, nearly 400 m. N.W. of Uskub. The environs produce fruit, mulberry, and tobacco in abundance, and the place is a centre of the silk industry. Until 1690 the famous monastery was the residence of the Serbian patriarchs. Pop. about 10,500, four-fifths being Mohammedans.

Iphicles, in Greek legend, son of Amphitryon and Alcmena, and half-brother of Hercules, whose faithful companion he was.

of Thrace, whose daughter he married. In 377 he commanded a mercenary force employed by the Persian king to quell a revolt in Egypt, and remained there until 374. The next year he commanded an Athenian expedition to Coreyra; in 369 he commanded the Athenian forces which assisted Sparta against Thebes. In 356 he held command in the Social war, and he and Timotheus were prosecuted for not assisting their colleague Chares.

Iphigenia, in Greek legend, was the daughter of Agamemnon and Clytemnestra. When the Greek expedition was about



Bartholomew, Edinb.

and breaks with a short fracture, showing, in transverse section, a thick dark-gray bark and the small cord of wood in which no pores are discernible with a lens. The powdered root contains from two to three per cent. of the alkaloids emetine and cephaeline, which are the active principles, besides a large amount of starch. Emetine is a white amorphous powder that acts as an expectorant, whilst cephaeline is crystalline, and a powerful emetic. Ipecacuanha is used either in the form of powder or wine; in small and repeated doses it acts as a diaphoretic, causing free secretion of the thin mucus, and is largely used in croup and other affections of the respiratory organs. In large doses it

Iphicrates (c. 420–348 B.C.), Athenian general, of humble birth, who made his name by developing the Greek infantry force known as *peltasts*, who were armed with a small round buckler (the *pelta*) and a linen corselet, instead of the heavy oblong shield and brazen cuirass of the *hoplites*. He improved the *peltasts*' equipment by giving them longer spears and swords; and with such a force, who were no doubt mercenaries, he cut to pieces a Spartan regiment in 390 B.C. during the Corinthian war, and two years later repeated his exploit on the coast of the Hellespont against a Spartan force under Anaxibius. But during the next ten years he was fighting for Cotys, king

to set sail against Troy from Aulis, the prophet Calchas advised Agamemnon to sacrifice Iphigenia to appease the goddess Artemis, which he did. Later accounts say that Artemis carried off Iphigenia to the Tauric Chersonese, to be her priestess there; and there she stayed, until her brother Orestes came. Pausanias tells us that, at Hermione, Artemis had a temple under the name of Iphigenia; and it is probable that, in her connection with Artemis, Iphigenia is but the goddess herself under another name. See Euripides's two fine plays, *Iphigenia in Aulis* and *Iphigenia in Tauris*. Racine wrote a tragedy with this title, as did also Goethe; and there are operas by Gluck.

Iphigenia, a British second-class cruiser (3,600 tons) launched in 1891. Since 1780 there have been naval ships of this name.

Ipiales, tn., Cauca, Colombia, S.E. of Pasto, near the Ecuador frontier. Pop. 10,000.

Ipomæa, a genus of beautiful plants belonging to the order Convolvulaceæ. They bear bell-shaped or salver-shaped flowers of every colour. Many of the species are climbers or twiners. All are easy to grow if they are provided with soil of moderate depth and richness.



Ipecacuanha.

1, Flower; 2, portion of root.

Ipsambul, IBSAMBUL, or ABUSIMBEL, ruins on the l. bk. of the Nile, Nubia, 25 m. N. of Wady Halfa. The two magnificently-sculptured rock temples were erected in the face of a steep rock by Rameses the Great.

Ipsus, small tn. in Greater Phrygia, in Asia Minor; here, in 301 B.C., Seleucus and Lysimachus defeated Antigonus.

Ipswich. (1.) Municipal, parl., and co. bor. and seapt. in Suffolk, England, at the head of the Orwell estuary, 68 m. N.E. of London. Noteworthy churches are St. Mary-at-the-Quay (15th century), St. Mary-at-the-Tower, St. Margaret, St. Mary Stoke, St. Nicholas, St. Peter's (formerly connected with the Augustinian monastery, on the site of which Wolsey erected his college, now represented by a gateway), and St. Stephen's. Christchurch Park and the Arboretum are recreation grounds. The ancient house, formerly called Mr. Sparrow's, in

the old butter market, is a fine example of 16th-century domestic architecture. The manufacture of agricultural implements employs nearly 2,000 persons. In addition, there are engineering, railway plant, and chemical manure works, breweries, tanneries, and other industries. The Eastern Counties Dairy Institute, established at Akenham in 1888, was transferred to Gyppeswyk Park in 1895. The wet dock, completed in 1842, is one of the largest in the kingdom. The value of imports and exports amounted in 1904 to £882,261, mostly imports. Besides the Augustine monastery, the Black Friars, the Franciscans, and the Carmelites had houses here. Wolsey was born in Ipswich. The town returns two members to the House of Commons. Area (munic. and parl. bor.) 8,428 ac. Pop. (1901) 66,622. (2.) Town, Queensland, Australia. It was originally known as Limestone, and stands on the Bremer R., 24 m. w. of Brisbane by rail. It is in a mining (coal) district. Pop. (1901) 8,637.

Iquique, seapt., prov. Tarapaca, Chile, on the Pacific coast. Large quantities of nitrate of soda are exported. The mines lie on the coast cordillera, at an elevation of about 3,300 ft. Here a battle was fought between the Peruvians and the Chileans in 1879, and in 1891 it was seized by the Congressionalist forces of Chile, who made it their headquarters. Pop. (1901) estimated at 42,500.

Iquitos, S. American aborigines who formerly occupied a wide domain about the rivers Tigre, Nanay, Napo, and other affluents of the Upper Amazons. Many adopted Christianity in the 18th century, but wooden idols carved in the shape of birds and beasts are still secretly worshipped.

Iquitos, tn., dep. Loreto, Peru, on the Upper Amazons R., 210 m. w. of Loreto; is the centre of trade for the Marañon, Huallaga, and Ucayali Rs., and exports india-rubber. Pop. 12,000.

Irak-Ajemi. (1.) Central part of Persia, and almost corresponding to the ancient Media. It consists very largely of elevated table-lands with fertile valleys, yielding abundance of cereals and fruits. In the E. is the Dasht-i-Kavir, or Great Salt Desert of Khorassan. Irak-Ajemi comprises the modern districts of Kurdistan, Ardelan, Luristan, Ispahan, and Kashan. Area, 138,190 sq. m. Pop. 1,000,000. (2.) Province, Persia, bounded on the E. by Kum and Kashan, and on the W. by Burujird; is exceedingly fertile, and produces large quantities of grain. Many of the villagers weave carpets, most of which are exported to Europe. The capital is Sultanabad.

Irak-Arabi, dist., Turkey in Asia, almost coincident with the ancient Babylonia, between the lower courses of the Tigris and Euphrates. It contains the ruins of ancient Babylon, Seleucia, and Ctesiphon, and the modern towns of Bagdad and Basra. Pop. about 2,000,000.

Iran, in early times, the name applied to the great Asiatic plateau which comprised the entire region from the Caucasus, the Caspian Sea, and Russian Turkestan on the N. to the Tigris, the Persian Gulf, and the Arabian Sea on the W. and S., and extended to the Indus on the E., likewise comprising the modern Afghanistan and the territory to the N. of it as far as the Jaxartes R. The extremes of climate over this wide area were as great, and the diversity of features and characteristics as prominent, in ancient times as is the case to-day. Both in ancient and in modern times the land of Iran, although a somewhat ill-defined unit, has been of great importance geographically and ethnologically, and in its influence on history and on the diffusion of the Indo-Germanic tongues. It obtained its name from its early inhabitants, who belonged to the Iranian branch of the Aryan family. The name is now the official designation of Persia. See PERSIA.

Irapuato, tn., prov. Guanajuato, Mexico, 30 m. S.S.W. of Guanajuato. It possesses a number of ancient churches and convents. Pop. (1895) 18,593.

Irawadi, or IRRAWADDY, the chief river of Burma, is formed by the confluence of the Mali and N'mai Rs., which rise in the extreme N.E. of Assam, near the frontier of Tibet. Its general course is from N. to S. for 1,500 m.; it discharges into the Bay of Bengal, between the Gulf of Martaban and Cape Negais, through an extensive delta by several mouths. This delta is a prolific rice-field. Below the confluence of its two main arms the river swirls and foams through narrow defiles. It is navigable for boats and small steamers for 140 m. above Bhamo, or 1,170 m. from the sea. The river is a main highway of commerce, and a railway accompanies it from Rangoon to Myitkina. The value of the river-borne trade is said to be two and a half millions annually.

Irbit, tn., Perm gov., E. Russia, 115 m. N.E. of Ekaterinburg, on the E. or Asiatic side of the Ural Mountains, at the junction of the Irbit and the Nitsa (Ob basin). Here is held (February 15 to March 15) the chief fair of Asiatic Russia, second only in importance to Nijni Novgorod among the fairs of the empire.

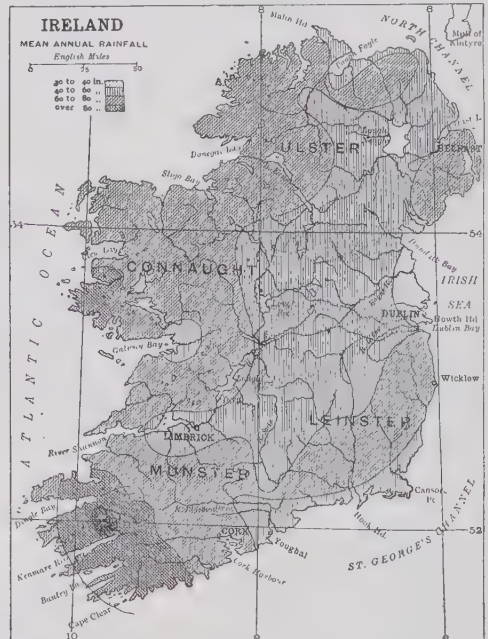
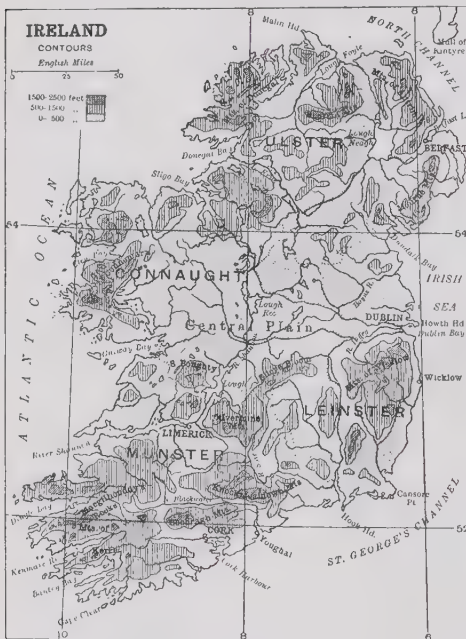
Total turnover estimated at from £5,000,000 to £7,000,000. Pop. (1897) 20,064.

Ireland (Ir. *Eire*; Lat. *Hibernia*, also *Scotia*; poetic, *Erin*). Ireland rises from the continental plateau in close connection with Great Britain. Its area is 32,583 sq. m.; 945 m. being occupied by water, and 1,800 m. by bogland. The western coast is greatly indented, and the sea runs far inland at certain points on the south and east. These inlets are submerged valleys, while rocky islands, such as the Blasket group, represent the peaks that once rose above them. Similarly, the shelves of the Aran Isles are relics of the region

Galtee range (Galtymore, 3,015 ft.), and the Knockmealdown and Comeragh Mountains, all belong to this one system of folding. Still older ridges assert themselves in the north-west and south-east, running from south-west to north-east, and formed by earth movements at the close of Silurian times. These great rock-folds were frequently filled up with molten matter from below, which consolidated as granite. The granite chain of Leinster (Lugnaquilla, 3,039 ft.), with its seventy miles of moorland, the axes of Newry and the Ox Mountains, and the rugged highlands of Donegal, were upheaved at this

north and west the sea was admitted to the valleys, as on the coasts of Scotland and of Norway, while a shallower sea was formed between Wales and the Leinster highland. One deep hollow (140 fathoms) occurs in the thirteen miles of water that separate Antrim and Kintyre.

The central plain, cumbered with glacial detritus, possesses no clear watershed. The largest river, the Shannon, wanders south as a lowland stream for 200 m., broadening out into a chain of lakes upon the way. The Bann rises on the west flank of the Mourne Mountains, and runs through Lough Neagh to the sea below Coleraine. The Erne,



of Carboniferous limestone that once stretched far to westward. The high masses of Ireland are grouped towards her margins, leaving an almost level central tract, broken by the Slieve Bloom range (1,500 ft.) and some minor ridges. At the close of the Carboniferous period the south became crumpled into a series of eastern and western folds, while a few ranges, with broad depressions between them, were formed in the more resisting region to the north. The Coal Measures and Carboniferous limestone were then worn away from the ridges, along which Old Red Sandstone and Silurian strata became exposed. The mountains of Kerry (Carrantuohill, 3,414 ft.), the

earlier epoch; while the crystalline rocks of Mayo and Galway probably represent a still more ancient continent. On the other hand, the granite of the picturesque Mourne Mountains (Slieve Donard, 2,796 ft.) broke through Silurian strata as recently as the Eocene period; at the same time, sheets of basaltic lava were poured out, which now form the high plateaus of Antrim. The columnar structure of the Giant's Causeway is a fine example of the effects of contraction in these lavas as they cooled. Ireland became an island somewhere about the Glacial epoch. The basin of Lough Neagh, the largest lake in the British Isles, dates from this epoch. On the

starting in the midland county of Longford, forms a series of loops enclosing limestone islands (Lough Oughter), and two fine lakes between Cavan and Donegal Bay. The Barrow and the Nore, also from the midlands, flow south to Waterford, with the high Kilkenny coal field between them. The Slaney, parallel with them, has taken advantage of the one great gap across the granite chain of Leinster. The Liffey, rising on the moors some thirteen miles from Dublin, meanders characteristically when it meets the limestone lowland, and only reaches Dublin Bay after a course of 75 m. The southern rivers mostly run east and west between the Old Red

English Miles



Sandstone ranges, along fertile valley floors of limestone. The sudden southward bend of the Lee and the Blackwater is a relic of an earlier system of drainage. The streams going west from the watershed on the Kerry border have had their lower courses converted into inlets of the Atlantic. The Suir rises near the Nore as an uncertain river of the plain, runs as far south as the limestone lowland stretches, and is then turned east by the Knockmeal-down range, until it joins the waters of the Nore and Barrow near Waterford.

Though copper and lead occur, ore-mining is practically at a standstill, with the exception of

the mountain rim of Ireland, and is chilled as it rises over it. The rainfall is consequently heaviest near the coast, rising in Kerry to 120 in. Dublin lies in a small area that receives less than 30 in. The warm Atlantic waters maintain an even temperature along the coast, and fogs are rare. The average and fairly uniform temperature for the year is nearly 50° F. The country suffers, however, from the uncertainty of the weather during summer. The climate may be responsible for the fact that nearly as many persons die in Ireland from tuberculosis as from old age. As in other countries, the deaths from cancer show a

rise probably arrived across dry land prior to the Glacial epoch, since they are members of the fauna of S.W. Europe. The flora of S.W. Ireland similarly includes Pyrenean types unknown in Great Britain. An orchid (*Spiranthes romanzoviana*), the pipewort, the blue-eyed grass of Canada, and a rush (*Juncus tenuis*), have reached Ireland from N. America.

Agriculture is the chief industry of Ireland. There is a marked difference between the 'light' soils on the Old Red Sandstone and the clays accumulated in hollows floored with limestone. The great levels of the limestone plain provide an ideal grazing-ground for



the stratified iron ores in Co. Antrim. Rock salt is raised from Triassic beds near Carrickfergus. Anthracite is mined near Kilkenny, and ordinary coal in the outliers near Lough Allen (Anigna), and at Coalisland in Tyrone. Good building limestone abounds, especially in Co. Roscommon; red marble is quarried near Cork, and black near Galway and Kilkenny. A unique green serpentine marble is worked in Connemara.

Though south-east storms break often on the Leinster coast, the prevalent winds over the whole country are from the west and south-west. The air is charged with moisture when it reaches

marked increase in recent years. The growth of insanity has been attributed to the close intermarriage in some western counties, and to the constant loss of national vigour through emigration.

The most striking feature of the Irish fauna is the absence of reptiles, except the English lizard; the mole is unknown, and the weasel is extinct, while the hare is a Scottish species. About twenty species of mammals occur, as against forty in Britain and ninety in Germany—a fact that points to the isolation of Ireland before the complete European fauna could enter it from the east. The Kerry slug and some other humble ani-

cattle; and year by year more land has been withdrawn from tillage, even the potato crop showing a decline from 1,172,079 ac. in 1860 to 616,623 in 1905. Pasture now forms 76 per cent. of the cultivated land (53 per cent. in 1860). Young cattle are largely exported for fattening in Great Britain. Horse-breeding, as represented by the annual show of the Royal Dublin Society, is highly successful. The co-operative movement in farming has led to a great improvement in dairy produce. Flax is grown in the N. The sea fisheries have been fostered, with excellent results. Distilling and brewing are important in the great towns. Bel-

fast, however, owes its prosperity to shipbuilding, and to the linen industry, which employs the available female labour. Home-spun tweeds and lace are made in certain districts.

The chief steamer lines to Great Britain run from Belfast (the short-passage Stranraer boat starts from Larne, 23 m. to the N.); from Dublin, which has also a mail service from Kingstown, 6 m. to the E.; from Waterford; and from Cork. American liners call

with the aid of a canal near Limerick, from Lough Allen to the sea.

Co-operative Raiffeisen banks are proving of benefit to the farmers. One-pound notes circulate, as in Scotland. The Irish mile, still used popularly, is 2,240 yards, or about two kilometres; the Irish acre equals 1.6198 statute acres.

The government of Ireland is administered by a Viceroy, a Lord Chancellor, and a Chief Secretary

Wexford, Carlow, Kilkenny, Kildare, King's Co., Queen's Co., Westmeath, and Longford. **MUNSTER:** Waterford, Cork, Tipperary, Kerry, Clare, and Limerick. **CONNAUGHT:** Galway, Roscommon, Mayo, Sligo, and Leitrim. **ULSTER:** Donegal, Londonderry, Antrim, Down, Armagh, Monaghan, Cavan, Tyrone, and Fermanagh.

Dublin (pop., including Rathmines, Rathgar, and Pembroke townships, 349,039) is the official and professional centre for the country. Belfast (pop. 348,965) has grown far more rapidly, owing to its industrial energy. Cork (pop. 76,122) shows the architectural improvement now characteristic of Irish cities. Limerick and Galway have suffered from the decline in population; but Londonderry is still a growing city, with a population of nearly 40,000.

The High Court of Justice sits in Dublin, where the Land Commission, remodelled in 1903, also performs judicial functions. The police of the country is consolidated in one force, the Royal Irish Constabulary, with headquarters in Dublin Castle. The Third British Army Corps is located in Ireland, and Kingstown serves as a naval station.

The University of Dublin includes Trinity College only, its degrees being now open to women. The Royal University of Ireland is an examining body in close connection with the state-supported Queen's Colleges of Belfast, Cork, and Galway. The Catholic University College and Alexandra College (for women) in Dublin, which receive no direct state support, also prepare students for the Royal University degrees. The Department of Agriculture and Technical Instruction maintains the Royal College of Science for Ireland and the agricultural institute at Glasnevin. A Board of Intermediate Education awards grants to secondary schools, and controls their curriculum, in which science is now prominent. The primary schools are under a Board of National Education. The Christian Brothers have played a conspicuous part in the development of education throughout the country.

There is now no state-established church in Ireland. The census of 1901 showed that the Roman Catholics formed 74.3 per cent. of the population, Protestant Episcopalians being 13 per cent. and Presbyterians 10 per cent. In Ulster there are nearly nine Protestants to every seven Roman Catholics. The national holiday is St. Patrick's Day, March 17; and the battle of the Boyne is commemorated by partisans in the north on July 12.



at Queenstown, and at Moville, N.E. of Londonderry. In 1904 the imports into Ireland were valued at £13,371,039, while the exports only totalled £1,423,811.

Considering the decline in population, the railways are remarkably efficient and well equipped. The government has supplemented the service by assisting the construction of light railways. Two canals (Royal, about 100 m.; and the Grand, 166 m.) connect Dublin with the Shannon, which is itself navigable,

for Ireland. The 103 members of Parliament sit in the House of Commons in London, and 23 representative peers, elected for life, in the House of Lords. The system of county and other elected councils is closely assimilated to that of England. Representative boards assist in the work of the Department of Agriculture and Technical Instruction.

The ancient provinces of the country are subdivided into counties, as follows:—**LEINSTER:** Louth, Meath, Dublin, Wicklow,

The population of Ireland on March 31, 1901, was 4,458,775, a decrease of 245,975 in ten years. The annual decrease naturally tends to diminish: it was about 18,000 in 1902.

See G. H. Kinahan's *Geology of Ireland* (1878); E. Hull's *Physical Geology of Ireland* (2nd ed. 1891); E. Forbes's 'Distribution of Fauna and Flora of British Isles,' in *Mem. Geol. Survey of Great Britain* (vol. i. 1846, p. 336); A. G. More's *Cubele Hibernica* (2nd ed. 1898); J. Deniker's lecture to Anthropological Institute (1904); Sir J. W. Moore's *Meteorology* (1894); *Ireland, Industrial and Agricultural*, Department of Agriculture and Technical Instruction (1902); Sir H. Plunkett's *Ireland in the New Century* (1904).

History.—Ireland was occupied, as far as we can go back in historical times—this is proved by Zeuss—by tribes of the great Celtic family; a Celtic immigration from Spain appears to have effected what has been called the Milesian conquest. The shores of Ireland were perhaps visited by Phœnician traders, but the island was never brought under the rule or within the influence of the Roman empire. The population was probably for centuries nomadic; but legends survive of a shadowy monarchy in which we see figures of heroic warriors and lawgivers. The conversion of the island to Christianity in the 5th century, through the preaching of its great apostle Patrick, is the first important event in its history. Paganism and the priesthood of the Druids disappeared. The Christian church Patrick founded carried the word of life through many parts of Europe, including England and Scotland; holy men from Ireland were honoured guests of Charlemagne; thousands of Christian exiles, fleeing from the barbarism that marked the fall of the empire, found a refuge in the secluded island of the west. We can obtain something like a clear idea of Ireland and her political and social state when we reach the 7th and 8th centuries. The population had long ceased to be nomads; but the land, as in the case of all Aryan communities in the early stage of their history, was largely held in collective ownership; individual ownership, however, being developed by agriculture, its great creator. The idea of nationality did not exist. A supreme monarchy, elective in theory perhaps, had existed for a considerable time, and had become hereditary in the Hy Niall line, the fathers of the O'Neills of another age. There were four or five subordinate kings; under them

a succession of lesser chiefs, each the master of a tribe, a clan, or a sept; and beneath them, again, whole orders of dependent vassals, from the coile to the fuidhir, tiller of the soil, and the slave, resembling in some degree the freeholders and the villeins of English history. The land was held in a gradation of loose tenures; but this organization had not the definite completeness of the feudal system. What was called law was declared and ad-

ministered by the Brehon sages, dependent upon the men in power. The succession of dignities and of the rights to land, the tanistry and the gavelkind, so denounced by Tudor lawyers, was different from that generally established under the feudal system; and the Irish Church, modelled upon the tribal type, had little in common with the feudal churches, and indeed was hardly in communion with them.



ministered by the Brehon sages, dependent upon the men in power. The succession of dignities and of the rights to land, the tanistry and the gavelkind, so denounced by Tudor lawyers, was different from that generally established under the feudal system; and the Irish Church, modelled upon the tribal type, had little in common with the feudal churches, and indeed was hardly in communion with them.

From the beginning of the 9th to the 11th century Ireland was exposed to recurring Danish inva-

sion. Unlike what was the case in England, the Danes did not establish themselves in Ireland; they only occupied a few towns on the coast: there is no trace of Scandinavian blood in the Irish Celt. The Danes were overthrown by Brian, the Irish Alfred, in a great fight at Clontarf (1014), near Dublin. Brian set aside the Hy Niall dynasty, and his memory still lives in his country's traditions. He was slain in his tent at the close of the

Adrian IV., gave the king a commission to subdue the island.

The first Anglo-Norman invasions of Ireland were the filibustering raids of nobles and knights. They have preserved the names of Fitz-Stephen and Strongbow. Henry II. landed in Ireland in 1172, and was declared 'Lord of Ireland' at a general synod held at Cashel. His politic genius soon won over the Irish princes and chiefs, and the bonds of feudalism were thrown over the island. The conquest, however, was one in name only. The rule of the Englishry, as they were called, was limited to a region known as the Pale, the borders of which repeatedly changed. John

century Ireland was divided into a Pale gradually becoming contracted, an undefined but large Anglo-Norman region beyond, and vast tracts still the land of the Celt, with his tribal organization and native chiefs. Though overshadowed by the great house of the Geraldines of Kildare, the Pale had an image of an established government in its viceroys, its parliaments, and its Anglican courts of justice; Norman and English law was administered in the Anglo-Norman districts; the Celtic territories still exhibited the type of the old social life; and there was some commerce with England, with Scotland, with France, and with

Norman houses of the Butlers and the Desmond Geraldines. These were the overlords of Celtic princes and chiefs, who, with their dependants, gave them a rude allegiance; and as they were at continual feud with each other, their lordships were theatres of savage warfare and of incessant rapine. In the Celtic territories, too, there was continual strife, partly between the Englishry and the native chiefs, partly between the chiefs. Moreover, the Anglo-Norman Church of the Pale and the ancient Irish Church were always at feud (see IRELAND, CHURCH IN), and the conflict between Norman and Brehon usage did much mischief.



John Bartholomew & Co.

and Richard II. were the only English sovereigns who set foot in Ireland in the middle ages. Ireland had fallen largely into the hands of great nobles, who were unrestrained by the crown, and often absentees. The principal cause, however, of the weakness in English power was a strange phenomenon dwelt on by all the old chroniclers. The sons of the Anglo-Norman conquerors in many parts of the island fell under the spell of the subtle Celtic genius, especially as this was seen in their wives. They 'became more Irish,' it was said, 'than the Irishry themselves'; they gave no real support to the Plantagenet throne.

Towards the close of the 14th

Spain. The noble Norman architecture, too, was seen in a number of stately abbeys and castles; this was much imitated by the Irish princes and chiefs; and the heads of both races were often united in marriage. But in the absence of the centralizing power of the monarchy, the island, for the most part, was a scene of oppression, misrule, and barbarous conflict. The Irishry often swarmed over the borders of the Pale; the Kildare Geraldines, supreme in this region, were a perpetual menace to law and government, and exercised all kinds of feudal exactions. Things were worse in the Anglo-Norman land, which had, to a large extent, fallen into the hands of the great

The dominion of England in Ireland markedly declined throughout the course of the 15th century. As the English and Norman elements became weakened, the Irishry encroached on the domains held by the conquering race. The Pale shrank into a narrow strip of land round Dublin. But Henry VII. sent (1494) Sir Edward Poyning, an able man, to Ireland, to attempt to strengthen the monarchy and English rule. Poyning effected important reforms (see POYNINGS, SIR EDWARD), but these proved of little avail. Ireland fell into the hands of Gerald, the great Earl of Kildare, who reigned under the mere nominal authority of the crown. Henry VIII.

laid down a scheme for governing Ireland—one of the wisest that has ever been conceived by British statesmen. His aim was to found the power of the crown on an aristocracy of Anglo-Norman and Irish descent, and to introduce civilization by degrees through institutions and laws in accord with the Irish character. With these objects in view, he conferred peerages on leaders of both races; he assembled parliaments composed of the Englishry and the Irishry; he sent commissioners through the island to maintain order; above all, he gave special commands that English laws were not to be forced upon a community not in sympathy with them, and that the

The chiefs of the leading tribes of O'Moore and O'Connor, which had long been the terror of the Pale, were crushed by the arms of Mary Tudor; their domains were parcelled out among English settlers; the names of Philipstown and Maryborough, and of the King's and Queen's Counties, commemorate the advance of English conquest. Elizabeth tried for a time to tread in her father's footsteps, and to return to his early and wise Irish policy; but she was compelled to give up her purpose. Ireland remained Catholic, while England and Scotland were becoming Protestant. The quarrel between Shane O'Neill, the head of the most powerful of the

divided among English colonists. There were also other irregular risings, all marked by the same features, and with the same results. These ended in the great rebellion of Hugh O'Neill, a kinsman of Shane. This, unlike the fitful efforts of preceding years, approached a general movement of the Irishry against British rule. Hugh O'Neill was an able soldier and statesman; his cause also was seconded by Rome and by Spain. He was so successful for a time that the power of England was tasked to the utmost to overthrow her enemy, and even when he was subdued at last he was allowed to retain his great domains in Ulster.



usages of the Irishry might be
tempered but not destroyed.

To crown the edifice of the monarchy in his Irish dominion, Henry substituted the title of king for that of lord of Ireland. But Thomas, Earl of Kildare—the 'Silken Thomas' of the Celtic *Chronicles*—rose in rebellion against his sovereign; the rising was not unconnected with the great movement which was effacing the authority of Rome in England. As a result the princely house of Kildare was at last destroyed. Thenceforward the age of conquest, with confiscation following in its train, opened for Ireland, and was prolonged for a century and a half.

Irish tribes, and the men representing English power in Dublin was originally not owing to distinctions of creed, but it led to a savage conflict which spread over Ulster. It ended in the assassination of Shane and the forfeiture of his great tribal possessions. This was succeeded by the rebellion of the Desmond Geraldines, undoubtedly excited by Philip II. and the Pope. A fierce struggle raged for years in Munster, in which levies of the Butlers—the feudal enemies of the great falling house—and English soldiery fought against the arrays of the Desmonds and their Celtic vassals. The Desmond domains were confiscated, and were

When this horrible conflict ended a third part of the population at least had perished; towns and villages had been practically blotted out; the abbeys and castles of the middle ages were ruins. The hideous description of Spenser is sufficiently known. The element of religion, too, had come in to envenom what had been chiefly a war of race. The Norman Church of the Pale had expanded with the march of conquest, and had become the Anglican Church spreading over the island; the old Irish Church had been made a satellite of Rome; the inveterate hostility of both churches had grown more intense: the era of Protestant ascendancy.

in a word, was in its sinister dawn. English laws and institutions were forced on a people which regarded them with hate. Ere long the domains of Hugh O'Neill and his kinsman O'Donnell were declared forfeited, for reasons that have never been known, and six counties of Ulster were placed at the disposal of the crown. Colonists, for the most part of Scottish blood, were poured into parts of this vast tract. The previous settlements of the Englishry had well-nigh been failures, but this 'plantation of Ulster' was conducted under better conditions, and, with other Scottish settlements in Antrim and Down, it has created a thriving community in the prosperous northern province. The reign of Strafford in Ireland soon succeeded. The great despot improved the material state of Ireland, but he governed the country by the sword and a submissive Parliament, and he 'marked down all Connaught; it has been said, 'for his majestic rapine;' while his master cruelly deceived his loyal Irish subjects by repudiating the pledge he had given as to what were known as the 'Graces'—a limit placed on the confiscations that were in progress.

The never-ceasing confiscation of the Irish land was the main cause of the great Celtic rising of 1641, which has been unjustly described as a general massacre of the English settlers. This was followed by a partial rising of the old Englishry of the Pale, still nearly all of the Catholic faith, who resisted the Puritanism of the men now in power in Dublin, and other wrongs of which they had to complain. But the Long Parliament offered tracts of land to 'adventurers' who would advance money to join in the crusade it had planned against the 'Irish Papists.' At this time the power of England in the island was in great danger. The forces of the twofold insurrection were supported by what was known as the 'Confederation of the Irish Catholics,' having at its head Rinuccini, an envoy from Rome. This made the wrath of the Long Parliament more intense than ever. Charles began to temporize with the Catholic Irish chiefs. Ireland, so to speak, was thus thrown across the path of England as an enemy in a crisis of national peril. The Parliament, however, was baffled for a considerable time. Owen Roe O'Neill, the leader of the Irish Celts, and Preston, the leader of the old Englishry, gained successes that might have had important results; but, as usual, Irish discords and divisions wrecked their cause, and the pretensions of

Rinuccini made bad worse. After negotiations with the Catholic League on behalf of his master, Ormonde, the viceroy, and head of the royal army, gave up his trust to commissioners of the Long Parliament, and left Ireland.

After the tragic death of Charles I. Ormonde returned to Ireland. The old Englishry joined him; Owen Roe O'Neill and his Celts had dealings with him. His forces overran the country, and Dublin and Derry were the only towns that held out for the Parliament. But Ormonde failed in an attack on the Irish capital; Owen Roe O'Neill died, and his league of Celts was broken up. Cromwell landed in Dublin in August 1649, at the head of 10,000 warriors of the new model. He was the executioner of Puritan justice and of English vengeance. The deeds he did at Drogheda and Wexford were appalling; but the passions that had been aroused must be taken into account. The severities, too, of Cromwell were not prolonged for years, like those of the Elizabethan soldiers. He subjugated Ireland in a few months as she had never been subjugated before. He resolved to colonize the island on a scale hitherto not thought of. The plantation of Ulster had proved successful. The policy of Cromwell was to confiscate the greater part of the conquered land, and to occupy it with men of the Puritan faith and of English blood. Huge tracts in twenty-nine of the thirty-two Irish counties were reserved for the commonwealth, for bestowal on the 'adventurers' who had backed the Long Parliament, or on the soldiery of the Cromwellian army. The dispossessed owners were relegated to 'Connaught or hell'—this was the grim tradition of the time—and 'courts of claims' were set up to arrange the forfeitures. Cromwell's calculation was that the soil of Ireland would by these means be almost wholly transferred to between 30,000 and 40,000 new owners, who would form a mainstay of British power.

This great scheme of colonization comparatively failed. The lands marked out for confiscation were, indeed, transferred to the 'adventurers' and soldiers who were to possess them; but the Puritan warriors especially sold them for a mere trifle; in a few years, like the old Anglo-Normans of the Pale, they were transformed by the influence of the Celtic genius, and gradually swept into the mass of the Irishry. In less than two generations not more than 3,000 or 4,000 new owners were to be found; but this settlement of the sword

still lives in Irish tradition—a 'Cromwellian landlord' is still a name of reproach. The island, however, made some advance in material welfare under the protector's rule, which enforced law and maintained order, and a union with England was accomplished for the first time. At the restoration Charles II. threw over hundreds of loyal Irish gentlemen who had fought for the crown; he lavished large grants of land on favourites; but the Cromwellian forfeitures were for the most part confirmed by what are still known as the Irish Acts of Settlement. Many of the ruined Irish owners went into exile, and became the forerunners of the celebrated Irish Brigade. But Ireland, on the whole, improved under the mild sway of Ormonde. James II. trod in his unhappy father's footsteps, and aimed at making the Irish Roman Catholics instruments in furthering his designs against English liberties. Tyrconnel, his deputy, trampled on the Protestant English colonists, and promised Catholic Ireland revenge; above all, he arrayed an Irish Catholic army, of which part was sent across the Channel, to give sinister support to the king.

After the revolution of 1688 the Irish Catholics rose to a man on behalf of James II. Few such universal risings have been seen in history; this was almost a great national effort. The Irish army at first carried all before it. The English and Scottish settlers were well-nigh driven into the sea; but Derry, now called Londonderry, made a heroic defence—the progress of the insurrection received a decisive check. Meanwhile James had landed at Kinsale. He assembled a Catholic Parliament in the Irish capital. The conduct of this assembly hardly deserves, though open to grave censure, the execration it has received. The worst acts of the king were to debase the currency, and to sanction deeds of oppression which perhaps he could not prevent. Ireland was thus again made a foe of England, at a crisis when England's fortunes were at stake; and she became the battlefield for the struggle between William III. and Louis XIV., the representatives of the Protestant and the Catholic conflict in Europe. William was victorious at the battle of the Boyne (1690), but the Irish army made its way to Limerick; and after suffering a severe defeat at the hands of Sarsfield, a gallant warrior of the race of the old Englishry, the king was compelled to raise the siege, the defence of the place having been as noble as that of Londonderry. France had had for some time an

armed contingent in Ireland; but Marlborough captured Cork and Kinsale, and severed her communications by the sea. The decisive battle was fought at Aughrim on July 12, 1691, and after the complete defeat of the Irish army 'the eye of Catholic Ireland closed in despair.' The capitulation of Limerick ere long followed. The military articles were respected—thousands of the Irish soldiery carried their arms into France—but the civil articles, unhappily, were not. The protection promised to hundreds of the Irish officers was denied; and the violation of a solemn treaty afforded too favourable opportunities for doing grievous wrong.

The Irish Parliament refused to sanction the treaty of Limerick; hundreds of thousands of acres were wrested from their former owners. The era of conquest and confiscation, which had continued during five generations in Ireland, had closed. It had been, in the main, a struggle of race; but it had also been a strife of religion, and if we except the old Englishry, the distinction of race coincided with the distinction of creed. The island was now divided between colonies of Protestant settlers, who had a monopoly of power and nine-tenths of the land, and a subjugated and downtrodden Catholic people; the age of Protestant ascendancy and Catholic subjection was running its course. But the penal laws of Ireland, borrowed from edicts against the Huguenots of France, aimed at the complete subjection and degradation of Catholic Ireland. The Irish Catholic was under a ban in every walk of life: he was 'presumed not to exist' in his own country; his church was persecuted and insulted in many ways. But the worst effects of these laws were seen in the land. This was strictly confined, as much as possible, to the Protestant caste. A Catholic could not acquire land or have an encumbrance on it; and the Catholic peasantry were kept down in a state of absolute thralldom. Enormous tracts were held by absentees who never beheld their estates; they sublet their possessions to a class called middlemen, the harshest oppressors of the Catholic serf. The Anglican Church—the Establishment, as it was called—spread over the country; it was a mere appanage of the government and the dominant class, almost devoid of spiritual life. The Irish Catholic Church lay, as it were, in the valley of the shadow of death.

This, the most dismal period of Irish history, was prolonged with little change for about half a century. The penal laws were

but too successful. Many of the Catholic gentry became soldiers of Austria and France; their dependants—the 'wild geese,' as they were pathetically called—filled the ranks of the famous Irish brigade. A few conformed to the dominant faith to live in peace. But all was not well with the Protestant settlers: the penal laws kept their lands out of commerce in a kind of mortmain. The selfish legislation, too, of the British Parliament destroyed Irish manufactures and starved Irish trade; Ireland was treated as a conquered colony, the spoil of English officials. The Irish Parliament, which by this time had a House of Commons of 300 members, and a House of Lords formed of ennobled settlers, was degraded into a kind of vestry: an appellate jurisdiction had been denied to its House of Lords; the British Parliament had asserted a right to make laws for Ireland. The island, in a word, was ruled as a mere contemned dependency.

A change for the better gradually passed over Ireland after the first half of the 18th century. The penal laws remained on the statute book, but the few Catholic owners of the soil were no longer harassed. Their estates were often held on secret trusts by their Protestant fellows, the rigour of the law being thus evaded; and these trusts, as a rule, were honourably observed. The colonial settlers, too, had become Irishmen, and felt that in Ireland they had a country; and as order was maintained generally in most districts, the wealth of Ireland markedly increased. The effects were seen in the land system: absenteeism was, to a great extent, lessened. The power, too, of the Irish Parliament was augmented. An 'Irish interest' grew up in it, opposed to the 'English interest,' which had been supreme; and this, though composed of a mere oligarchy, grossly corrupt, was nevertheless patriotic in a certain sense. The Irish Catholics made some way in the pursuit of commerce; Dublin and the seaport towns even began to flourish. The picture, however, had a darker side. Agrarian disturbances, known by the name of Whiteboy, were frequent and widespread, and were marked by horrible deeds. Protestant ascendancy, though apparently secure, was thus secretly menaced; and the country was almost without a middle class. Disturbances, too, were seen in the Scottish parts of Ulster, though these were transient and not grave; the Presbyterian traders and farmers disliked the Anglican Church, and had grievances in the existing land system.

This order of things was not much changed during the first twenty years of the reign of George III. The penal laws were slightly relaxed; the Catholic and Protestant gentry began to blend in marriage; but Protestant ascendancy remained enthroned in the land. The power of the 'Irish interest' increased in the Irish Parliament; it practically ruled the country on behalf of the crown. But the contest between England and her American colonies led to a revolution in the affairs of Ireland, attended with very considerable results. Protestant Ireland arrayed a great volunteer force with the primary object of protecting the country; then a cry went forth that the commercial restraints on Ireland must be removed. The concession was reluctantly made by England; this only led to a further cry for the emancipation of the Irish Parliament from the fetters in which it had long been bound. The movement had the illustrious Grattan at its head. The legislative independence of Ireland was declared in the spring of 1782, and was ratified by the Houses at Westminster.

By this settlement Ireland became nearly an independent state, united with Great Britain by the tie of the crown; the Irish Parliament was, in theory, almost as sovereign as the British Parliament. But though grave differences more than once arose, it was kept to a considerable extent in harmony with the more powerful assembly and its executive by the bonds of a common origin and faith; for it was wholly composed of Protestants of English and Scottish descent, and it was largely controlled by profuse corruption. Grattan, a great orator and statesman, was its master spirit. Unlike his rival Flood, a very able man, he was opposed to a reform of it, in the first instance; but he laboured hard to set Catholic Ireland free, and, as he said, to 'enlarge the Protestant colony into the Irish nation.' He did not realize a grand ideal; but Ireland certainly made much social and material progress under Grattan's Parliament, as it has been rightly called. The French revolution, however, disturbed the elements of a society too full of unnatural distinctions of race and faith. The influence of the great upheaval was first felt in Presbyterian Ireland; it then spread by degrees among the masses of the Irish Catholics. Pitt made concessions in the form of an ill-designed scheme of Catholic relief; but after the recall of Lord Fitzwilliam, a viceroy whose mind was bent on reform, the rule of

Protestant ascendancy became more than ever harsh. Thenceforward rebellion began to raise its head. The leader of the movement was Theobald Wolfe Tone. He had founded in Belfast the Society of United Irishmen, a body which at first had only constitutional views; he had then become secretary of a committee representing Catholic Ireland. But he had always been a rebel at heart; his object was to combine all Ireland against England, the common enemy.

A descent on Munster, made at the instigation of Tone, was effected by a French squadron in 1796. It reached Bantry Bay, but was blown off the coast by a tempest. There was a kind of veiled rebellion in many parts of Ireland in 1796 and 1797; the government struck it down when it appeared in Ulster. A more general effort was made in 1798; but Lord Edward Fitzgerald—a scion of the great Geraldine house—the leader of the rebel levies of the south, was arrested, with other chiefs of the United Irishmen. A plot to seize the castle of Dublin, and to attack the capital, failed. A fierce rising took place, however, in Wicklow and Wexford. It assumed the proportions of a civil war; hideous atrocities were perpetrated on both sides. The government, as in the days of Elizabeth, had no regular army, and had to rely on ill-disciplined bodies of Protestants; but the rebellion was at last quenched in blood. The struggle was a conflict partly of race and partly of religion; the Catholic peasantry rose against their Protestant landlords in several counties. It is a most significant fact that the leaders of the United Irishmen caused maps of the old confiscations to be made. The dregs of the rebellion of 1798 were stirred by a petty rising, of which the enthusiast Emmet was the head. Pitt now proposed a legislative union between Great Britain and Ireland. The measure was passionately debated in the Irish Parliament. It was carried by very unscrupulous means, and it became law in July 1800. The union, however, was an imperfect scheme. It left Ireland essentially a separate state; it merely merged the Irish in the Imperial Parliament; its financial arrangements for Ireland were not just; above all, it was not accompanied by the reforms which Pitt had wished to accomplish—the emancipation of the Irish Catholics, the commutation of the tithes of the Established Church of Ireland, and a provision for the Irish Catholic priesthood, the last promised by Cornwallis, the ministers' lord-lieutenant.

The twenty-nine years that followed the union are not an attractive period in Irish history. The 'English interest' in the government revived; the 'Irish interest' notably declined: the Irish aristocracy lost influence; a bureaucracy began to reign at the Castle. Protestant ascendancy appeared in a sinister form in 'Orangeism' and all that the word implies; there were many outbreaks of Whiteboyism and of agrarian crime, only partially quelled by severe repression. Absenteeism after the union increased, though absentee estates were better managed than before; but the population increased enormously in numbers. Affairs, however, went on reasonably well as long as the high prices of the war lasted; but the peace brought with it a collapse of prices and of the wages of labour, and distress in 1822 became famine in several counties. The emancipation of the Irish Catholics was, however, the principal Irish question in those years. The age was one of narrow Toryism in church and state. Protestant England was strongly opposed to the Catholic claims; they made no way in Parliament for a considerable time. Grattan's mantle fell on Plunkett in the House of Commons; O'Connell by degrees rallied all Catholic Ireland to his cause. A compromise was unwisely rejected by the House of Lords in 1825; but O'Connell made the Catholic association well-nigh supreme in four-fifths of the island. Catholic emancipation was reluctantly conceded in 1829, after a struggle which seriously menaced the state.

The great reform era of 1832 brought with it partial reforms for Ireland. The representation was slightly increased; a system of national education was set up; a poor law, too long withheld, was imposed on the land; the corrupt corporations, nests of the Protestant ascendancy of the past, were abolished. Symptoms of deep-seated evils, nevertheless, became manifest. O'Connell began to agitate for a repeal of the union; a movement against the tithes of the Established Church was attended far and wide with atrocious disorder. This led to the long-delayed commutation of the tithe, and to a change in the status of the church itself. Peel became prime minister in 1841; he had been associated with Protestant ascendancy when chief secretary from 1812 to 1818; O'Connell instantly declared again for a repeal of the union. The agitation assumed gigantic proportions, but it never had a chance of success. O'Connell

was convicted, though his trial was not a just one; the movement within a few months collapsed. Peel, however, brought in some Irish reforms. He increased the revenues of the Catholic Irish College of Maynooth; he tried to improve the education of the Irish upper middle classes, and especially of the Irish Catholics, by the institution of the Queen's Colleges; above all, he appointed the Devon Commission to inquire into the state of the Irish land system, which, owing to the presence of redundant millions on the soil, and to the claims of tenants in respect of improvements not protected by the existing law, had attracted the serious attention of the sagacious minister. But a catastrophe at this juncture befell Ireland which for a long time engrossed the mind of the government. The potato, almost the only food of the indigent masses, failed partially in 1845 and fully in 1846; many counties were soon within the fell grasp of famine. Peel and Lord John Russell's ministry manfully met the crisis. Exception may be taken to parts of Lord John Russell's policy; but if thousands perished, the nation was saved. The immediate results of the famine were seen in the great exodus of the Irish race, which in different degrees has continued ever since.

Daniel O'Connell, the 'Liberator of Catholic Ireland,' as he is known to history, passed away in the spring of 1847. A feeble rising took place in Ireland some months afterwards—it was connected with the revolutionary upheaval of 1848—but it quickly came to an ignominious end. A period of tranquillity, prolonged for years, followed; Ireland made decided material progress. The land, relieved of millions sunk in mere wretchedness, was thrown open to better husbandry; agriculture improved; the wealth of the country increased. This prosperity, however, was largely deceptive. An act passed for the sale of encumbered estates developed a very bad type of landlord; the claims of the peasantry for improvements and other rights were augmented; the land system became worse on its economic side. The diseased elements in the social life of Ireland were quickened into activity by the Fenian conspiracy, formed by leaders of the New Ireland across the Atlantic, which cherished bitter memories of the past famine, and of the expatriation of a third of the Irish people. It failed in an attempt to arouse rebellion in Ireland; but it alarmed and deeply stirred the mind of England and Scotland, which had been taught to believe that Ire-

land was finally at rest. Mr. Gladstone was called to power by the general election of 1868. He disestablished and disendowed the Anglican Church in Ireland (1869); he carried a Land Act (1870) which in a great measure removed the grievances of the Irish peasants' tenure; he attempted to effect a great reform in Irish education of the higher kind. Meanwhile a movement, practically for a repeal of the union, was inaugurated by Isaac Butt and a body of discontented Protestants, who resented the fall of the Irish Anglican Church. The Home Rule agitation, as it was called, soon drew the mass of the Irish Catholics to it; but it was long treated with contempt in Parliament. Butt, however, though a very able man, was not a man of action; the movement gradually passed into the hands of Parnell, a leader of a completely different type. Parnell, with a band of associates, soon made his mark by harassing the House of Commons by his skilful obstructive tactics; and he gradually became known among the Fenian leaders as the master spirit of a parliamentary following which had the independence of Ireland in view.

Erelong a movement had been set afoot in Ireland, the most formidable of that century, against British rule. Its author was Davitt. The movement, though in essence rebellious, was nevertheless to wear a constitutional mask. The Irish Land League was founded in County Mayo, in the spring of 1879, and gathering strength from the hardships of the time, soon made its way into several other counties. Mr. Gladstone, who in 1880 had again become minister, tried to weaken it by a reform of the Act of 1870; but his Compensation for Disturbance Bill was thrown out by the House of Lords. The Land League acquired greatly increased power; denunciations of Irish 'landlordism' were mingled with rebellious harangues; there was a frightful outburst of Whiteboy and agrarian crime, accompanied by the barbarous device of 'boycotting.' A repressive measure was passed by Parliament in 1881; but it was ill designed, and did not prove effective. Mr. Gladstone carried through Parliament a measure which transformed the whole Irish land system, giving the occupier of the soil the tenure known as the 'Three F's,' 'fair rent' being adjusted through the agency of the state, and converting the landlord into a kind of rent charger. But the reign of outrage and disorder did not cease; Parnell and his lieutenants

were put in prison. Their answer was a manifesto of 'No Rent;' this kept Ireland in trouble during several months. Mr. Gladstone suddenly changed his policy. He entered into a compact with Parnell; the government at the castle was changed also, in the supposed interest of the leader of the league. The assassinations, however, of Lord Frederick Cavendish and Mr. Burke brought this curious revolution to an end. A severe measure of repression became law, and the disorder caused by the league was by degrees almost completely put down.

Parnell, who had steadily kept to his purpose, founded the National League in the place of the Land League. The twofold conspiracy was practically the same. After the general election of 1885 Mr. Gladstone again made a change of front. He had hitherto always opposed Home Rule. He declared for it when he became minister for the third time, in 1886. His attempt, however, to establish what he called a 'statutory Parliament' in Ireland failed. Then there was another outbreak of agrarian disorder; but it was quelled by the firmness of Mr. Arthur Balfour. Mr. Gladstone returned to office with a small majority in 1892. His second Home Rule Bill, however, though it passed the House of Commons, was summarily rejected by the House of Lords. Since then the agrarian legislation of Mr. Gladstone has been extended; a system of so-called land purchase has been devised to make the occupier of the Irish soil its owner; Irish local government has been placed on a democratic basis. See IRISH LAND LEGISLATION. For language, see GAELIC.

The most important recent events in Irish history have been the visit of the King and Queen to Dublin (1903); the Irish Land Purchase Bill of 1903; and the resignation of Mr. George Wyndham, Chief Secretary for Ireland, over the incident connected with Sir Antony MacDonnell. (See DUNRAVEN.) See Froude's *English in Ireland* (1881); Ingram's *Critical Examination of Irish History* (1900); Bryce's *Two Centuries of Irish History* (1888); Lecky's *History of Ireland in the 18th Century* (1892), and *Leaders of Public Opinion in Ireland* (new ed. 1903); Daunt's *Eighty-five Years of Irish History* (1886); Madden's *Ireland in 1793* (1888); O'Connor's *The Parnell Movement* (1889); Holmes's *Hist. of the Irish Land League* (1882); Barnes's *Ireland in the Present Century* (1881); Connell's *The Irish Union* (1898); Ingram's *Hist. of Union of Great Britain and Ireland* (1887).

Ireland, CHURCH IN. The church of Ireland, according to tradition, was founded by St. Patrick. The noble missionary work it accomplished, in the ages that followed the fall of the empire, has gained for it imperishable fame. At home the church was modelled on the archaic Celtic tribal system. It differed widely from the churches of feudal Christendom, and, indeed, was regarded at Rome as almost schismatic. To reduce it to orthodoxy was a principal object of Adrian IV, in giving his sanction to the Norman conquest of Ireland. But though a church of the Roman type was established within the Pale, the ancient Celtic Irish Church remained unchanged. There were thus two churches in Ireland; their clergy were at continual feud; and in an age of incessant racial and tribal discord neither church flourished or produced distinguished men. The church of the Pale extended its borders with the march of conquest in Ireland; it became Protestant in the reign of Elizabeth, and was thenceforward known as the Established Church, but it was regarded as a symbol of foreign power, and had no hold on the mass of the Irish people. The old Irish Church, on the other hand, became, in the religious struggle of the 16th century, intensely papal; it rallied around it four-fifths of the Irish people who had adhered to the ancient faith; and its clergy became the leaders of what may be called Catholic Ireland.

During the civil wars in the 17th century the Established Church and its clergy were faithful allies of England, the Irish Catholic Church and its clergy her persevering enemies. The first was almost dominant in the land for a considerable part of the 18th century. The maintenance of the Established Church of Ireland was made a 'fundamental part' of the treaty of union (1800); but Pitt wished not only to 'emancipate' the Irish Catholics, as the phrase was, but also to make a provision for the clergy of their church.

In the great reforming era of 1832-40, the overgrown wealth and abuses of the Established Church were condemned; its revenues were distributed anew, and ten of its useless sees were extinguished; and after a bloody conflict, known as the Tithe war, its tithes were commuted into a kind of land tax. Meanwhile a great and decisive change had been passing over the Irish Catholic Church under the inspiration of O'Connell. Its clergy were the master spirits of the great movement which led to the

emancipation of Catholic Ireland in 1829. They also took a prominent part in the Repeal movement of 1843-4, and in the Land and National League movements of 1879-89, until these were condemned at Rome. The Established Church was disestablished and disendowed in 1869. Since that time it has been a voluntary church, and its members constitute but a fraction of the Irish community. The church of Catholic Ireland remains what it has always been—unfriendly to Protestant England and her institutions.

The Presbyterian Church of Ireland grew up with the settlements of the Scottish race in Ulster. It had acquired strength, and was spreading in the time of Stafford (c. 1633), who, when viceroy of Ireland, persecuted its clergy with his creature Bramhall. It seems to have been established, in a certain sense, under the rule of Cromwell. After the restoration, like the English nonconformist churches, it was an object of aversion to the statesmen of the Stuarts; but Charles II. gave it a small bounty, called the *Regium Donum*, which was considerably increased by William III. During the Tory reaction in the reign of Anne the Irish Presbyterian clergy were subjected to disabilities of a very grievous kind, not finally removed until the American war. The feelings engendered by these protracted wrongs made Presbyterian Ireland half rebellious in 1795-8; but since the union (1801) it has become attached to English rule, and its clergy were propitiated by a large addition to the *Regium Donum*.

The disestablished Anglican Church has two archbishops and eleven bishops at its head; it is self-governing through its general and diocesan synods; its clergy are about 1,600 in number. The Catholic Irish Church is under the rule of the Pope; its clergy number from 3,000 to 4,000 priests; it has four archbishops and twenty-three bishops. The Presbyterian Church of Ireland has nearly 700 ministers; a general assembly, with its presbyteries, conducts its affairs. See Olden's *The Church in Ireland* (1892); Macheth's *The Story of Ireland and her Church* (1899); Heron's *The Celtic Church in Ireland* (1898); and Liddall's *The Church of Ireland* (1886).

Ireland, ALEXANDER (1810-94), British author and journalist, was born at Edinburgh. In 1846 he succeeded Mr. (afterwards Sir) Edward Watkin as publisher and manager of the *Manchester Examiner*, with which paper he was connected till near his death. He was the author of *Ralph Waldo Emerson: In Memo-*

riam (1882); *Recollections of George Dawson and his Lectures in Manchester in 1846-7* (1882); *The Book-Lover's Enchiridion* (6th ed. 1890), his best-known work. Ireland was intimate with Carlyle, Leigh Hunt, and Emerson.—His second wife, ANNIE IRELAND (d. 1893), wrote a biography of *Jane Welsh Carlyle* (1891), edited her correspondence with Miss Jewsbury (1892), and wrote *Recollections of James Anthony Froude*, which was published posthumously in the *Contemporary Review*.

Ireland, WILLIAM HENRY (1777-1835), the forger of Shakespeare manuscripts, was born in London, and in 1794 was apprenticed to a London conveyancer, in whose office he had access to a collection of old deeds. From one of these he cut a piece of parchment, and wrote what purported to be a mortgage deed bearing the signature of Shakespeare. This he presented to his father (an enthusiast for everything Shakespearean), who accepted it as genuine, as did others. After this, Ireland forged a large collection of interesting relics, including a transcript of *King Lear*, and a new blank verse play, *Vortigern and Rowena*, which was purchased by Sheridan and produced once at Drury Lane, but met with ridicule. The hostile criticism of Malone and others at length compelled Ireland to make a full confession. See Malone's *Inquiry into the Authenticity of certain Papers attributed to Shakespeare* (1796).

Ireland Island. See BERMU-DAS.

Irenæus, ST. (c. 120-202), bishop of Lyons, seems to have been a native of Smyrna, or some part of Asia Minor. In early youth he came under the influence of Polycarp. He became a presbyter to Pothinus, bishop of Lyons, on whose martyrdom in 177 he succeeded to the bishopric. He sent many missionaries among the pagan Gauls. But he is best known by his attempts to mediate between the bishops of Rome and the churches in Asia Minor in their dispute about the proper day for the celebration of Easter, and for his opposition to the Gnostics and the Valentinians. Of his writings, only his *Adversus Hæreses* and a few fragments preserved by Epiphanius and Hippolytus are extant. See editions of his works by Erasmus (1526), Stieren (1851-3), Harvey (1857), and in Clark's *Anto-Nicene Library*.

Irene. (1.) The Greek goddess of peace, called Pax by the Romans; according to Hesiod she was a daughter of Zeus and Themis. (2.) Byzantine empress,

was a native of Athens, whom Leo IV. married in 769 A.D. Leo succeeded to the throne in 775, but in the same year banished Irene from the palace on discovering that she persisted in image-worship. After Leo's death in 780, Irene returned and governed the empire for her infant son; when he grew up he attempted to throw off her control, and she had him murdered in 797, and then reigned alone. She is said to have offered her hand to Charlemagne, with the idea of reuniting the empires of the East and the West. She continued to govern with power and prudence until 802, when the great treasurer Nicephorus rebelled, and banished Irene to Lesbos. Her devotion to the worship of images caused her to be canonized as a saint by the Greek Church.

Ireton, HENRY (1610-51), English soldier, born at Attenton, near Nottingham; joined the Parliamentary forces, and fought at Newbury (1644), and at Naseby (1645). He won the favour of Cromwell, whose daughter, Bridget, he married (1646). A republican zealot, he advocated and signed the warrant for the king's execution. Becoming Cromwellian lord-deputy in Ireland, he ruled with relentless severity, until carried off by fever at Limerick. His remains, buried in Westminster Abbey, were disinterred at the restoration, and hanged at Tyburn.

Irghez. See VOLGA and TURGAI.

Iriarte, TOMAS DE (1750-91), Spanish man of letters, born in the Canary Isles; was a writer of the newer French school fashionable in Spain under Charles III. He published a much-discussed translation of Horace and several comedies. A poem of his still much admired is *La Mustica* (1779; Eng. trans. 1807), inspired by Haydn; but Iriarte lives by his *Fabulas Literarias* (1782; Eng. trans. 1806), two of which—*The Donkey Flautist* and *The Dancing Bear*—are known throughout the world. See Cotarello's *Iriarte y Su Epoca* (1897).

Iridaceæ, an order of monocotyledonous plants, mostly inhabiting temperate and warm regions. It includes the crocuses, irises, ixtias, and gladioli. They have three petaloid sepals, three petals, three stamens inserted at the base of the sepals, three stigmas, and a three-celled capsule. The leaves are usually all root leaves.

Iridescence, the name given to the lustrous delicately-tinted sheen observed on certain surfaces, such as mother-of-pearl and the wings of certain insects. The phenomenon depends on the principle of interference.

Iridium, Ir, 193, is a metallic element of the platinum family. It occurs in alluvial deposits along with platinum, and is separated from it and other similar metals present by somewhat complex chemical processes. Iridium is a very hard, white, brittle metal, of sp. gr. 22.4, and is extremely infusible. It is most resistant to oxidation or solution, and forms two, if not three, series of salts, of which iridic chloride, IrCl_4 , is perhaps the most important. Iridium black, prepared by exposing to light a solution of iridium sulphate in alcohol, is even more active than platinum black in bringing about chemical action. Iridium has recently been employed for apparatus required to withstand very high temperature: alloyed with platinum, it is used for standard weights and measures; and alloyed with osmium, for tipping pens, bearings of compasses, etc.

Iriga, tn., prov. S. Camarines, Luzon, Philippines. Pop. (1898) 17,100.

Iris, in Greek mythology, was the daughter of Thaumas and Electra, and a sister of the Harpies. The *Iliad* represents her as the messenger of the gods. In earlier writers Iris appears as a virgin goddess, but later poets represent her as the wife of Zephyrus and mother of Eros. In Greek, the word *Iris*, as a common noun, means 'rainbow.'

Iris, a large genus of plants of the order *Irdeæ*, characterized by reflexed sepals, which are longer than the petals, and petal-like stigmas; the leaves are usually long and sword-shaped, or grasslike. There are two British species—the blue iris, or gladiolus (*I. fetidissima*), and the yellow flag (*I. pseudocorus*). Upwards of 160 species are known, and on account of their conspicuous and handsome flowers a large number are cultivated in gardens under the name of *fleurs-de-lis*. They are easily grown in ordinary garden soil, well drained, and stand abundant water and manure. Many superb varieties have been recently introduced from Japan.

Iris, the seventh asteroid in order of discovery, found by Hind, Aug. 13, 1847.

Iris, British second-class cruiser (3,730 tons), launched in 1877. The name was given to the *Hancock*, an American frigate captured on Aug. 18, 1777.

Irish Land Legislation. The earlier phases of this subject are dealt with under IRELAND—History. In England, the landlord, from ancient usage, almost always made the permanent improvements in his farms; in Ireland, the permanent improvements were made by the tenant. The equitable rights of the Irish

tenant were thus wholly at his landlord's mercy, and could be destroyed by eviction, or by the mere raising of rent. This grave economic vice in the Irish land system was greatly aggravated in the course of the 19th century, as the population enormously increased in numbers, as holdings were multiplied perhaps threefold, as the competition for land became intense, and large sums were paid on the transfer of farms, creating another set of equitable rights; but nothing was done for many years to redress these evils. This was one reason why 'Whiteboyism' and agrarian disorder continued to prevail, and were never fully put down. The tiller of the soil, deprived of the protection of the law, had recourse to a barbarous law of his own to maintain his hold on his farm.

Peel was the first minister who perceived some of the evils at least of this state of things, and in 1844 he appointed the Devon Commission to inquire into and to report upon the whole subject of Irish landed relations. But the commissioners were filled with prejudices in favour of English land tenure, and pronounced emphatically against recognition of Irish tenant rights; warned Irish landlords that these 'were eating away' their estates; and only proposed an illusory measure to compensate the tenant class in respect of future 'improvements.' The Irish land system ere long was shattered by the terrible results of the great famine of 1845-47. This visitation made hundreds of farmers of the better class bankrupt, and sent thousands of the poorer peasants to the Far West. The only remedy of British statesmen for Irish land tenure after the famine was to enact a statute for the sale of encumbered estates; but the act only created a class of very bad landlords, and destroyed, in tens of thousands of cases, the concurrent rights of the Irish tenant farmer in the soil. An agitation in favour of tenant right, as it was called, became active in Ireland; it manifested itself in a demand of what was known as the 'three F's'—'fixity of tenure,' 'fair rent,' and 'free sale'; but it was baffled by a discreditable intrigue in Parliament, and the land system was left as it had been before. A period of marked prosperity followed; but as the wealth of the country increased, the economic vices of the land system were felt to be more grievous. The concurrent rights of the tenant class in the land, caused by improvements and by sums paid on the transfer of farms, increased in an extraordinary degree. Yet these rights remained

outside the pale of the law, and were liable to destruction almost at the will of the landlord, except where they were partly safeguarded by the Ulster custom, and in a few instances by leases.

Having disestablished and disendowed the Established Church (1869), Mr. Gladstone addressed himself to the task of effecting a change in the Irish land system. The measure he carried through Parliament, if by no means perfect, was infinitely better than any which had been proposed before. This, the Land Act of 1870, gave the sanction of law to the Ulster custom, and to analogous customs in the southern provinces, which had been, however weakly, growing up. The act, however, went a great deal farther. It engrafted in the immense majority of Irish tenancies a tenant right of a potential kind, giving thus sanction, if indirectly, to the partial joint ownership which in thousands of instances the Irish tenant had gained in the land. The act, however, became law many years too late: the Fenian movement had spread socialistic ideas abroad, and the Land Act of 1870 was not accepted by the Irish peasantry as the great agrarian reform it assuredly was. In a few years the Land League stirred up a conflict about the land of Ireland. Mr. Gladstone brought in the Land Act of 1881, which extended the system of the 'three F's' to five-sixths probably of the farms of Ireland. It established courts for the 'fixing of fair rents,' annulling contract within this important province; it provided that rent should not be charged on improvements made by tenants, thus opening a door to litigation of the most harassing kind. Parliament passed the act. Through this legislation, the concurrent rights of the Irish peasant in his farm, and his partial joint ownership, have not only been vindicated in the most ample measure—he has acquired new proprietary rights in the land, to which it is difficult to see how he could have a claim. His superior, on the other hand, the Irish landlord, has been expropriated to a considerable extent. He has been changed from an owner in a real sense to little more than the possessor of a state-settled rent; and the rental of Ireland, through the action of the lately-established courts, has probably been reduced nearly forty per cent.

Before 1870 the Irish land system was essentially unjust to the tenant class in Ireland; since 1881 it has been made unjust to the Irish landlords. Moreover, the incessant litigation that the Act of 1881 has inevitably caused has aggravated the old divisions

of race and faith in landed relations; Irish landlords and tenants are now more estranged than they have been for a century. Unionist governments have attempted to redress these evils by inaugurating the system of so-called 'land purchase'; but this policy has not been successful. By a succession of acts, beginning in 1885, the state has been empowered to make advances to Irish landlords who wish to sell their estates and to place their tenants in their stead as owners. The object of this legislation has been to get rid of the 'dual ownership,' as the phrase is, created in 1881, and to produce 'a peasant proprietary' in the Irish land. The principal acts, following the Ashbourne Purchase of Land Act (1885), are the Acts of 1888 and 1891, the latter providing further funds for the purchase of land in Ireland, making permanent the Land Commission, and creating a Congested Districts Board. Two subsequent acts were passed in 1895 (extending the powers of the Act of 1881) and 1903, establishing a complete and comprehensive system of land purchase. See Montgomery's *History of Land Tenure in Ireland* (1889); Cherry's *Irish Land Purchase Acts, 1880-1891* (1893); Morris's *Land System of Ireland* (1888); and Lefevre's *Agrarian Tenures* (1893).

Irish Moss. See CARRAGEEN.

Irish Parliament. THE, growing out of the council in Dublin, appears to have been assembled for the first time (1295) by John de Wogan, a justiciary of Edward I. For two centuries, however, this body was little more than a convention, as Coke has written, of the 'great men' of the Pale. Its jurisdiction extended only over feudal Ireland, and was unknown in the Celtic region beyond; its borough representation was very small; its legislation was insignificant, and has nearly all been lost, or at least not published. Though modelled upon the pattern of the English Parliament, and composed of a House of Lords and a House of Commons, it was practically an instrument of the Irish viceroys, or of a few great Anglo-Norman nobles. The complete restriction imposed on the Irish Parliament by the famous Poyning's law (see POYNINGS, SIR EDWARD) may have been partly due to Tudor statecraft, but it was also largely due to the desire of the English colonists of Ireland to escape from the oppression of the governor and the leading men of the Pale. In 1540-1, Henry VIII., carrying out his enlightened Irish policy, called for the first time chiefs of the Celtic

Irish tribes to a Parliament in Dublin. These had hitherto been excluded by the statute of Kilkenny. Irish chiefs, also, appeared in a Parliament called in 1585; but their presence was rare in these assemblies of a foreign power. The Irish Parliaments of the late Tudor period as a rule conformed to the will of the government; the number of the members of the House of Commons was gradually increased as additional parts of the country came under the authority of the crown. An 'Irish interest,' however, hostile to the 'English interest' at the Castle, grew up in these assemblies. It was composed of the more independent settlers; it formed a regular opposition, which on more than one occasion crossed the will of the Irish viceroys. The legislation of the Irish Parliament, when James I. had ascended the throne, after the subjugation of the whole island, aimed at effacing the deep divisions of race and faith in Ireland; but these attempts were to prove unsuccessful. The Parliament, however, was giving proof of an independent spirit. James created forty petty boroughs, in order to pack it with nominees of the crown and to make his authority supreme. The Irish House of Commons, which had grown from about 100 to 190 members, was now composed of 232.

The Irish Parliament, when thus made subservient, as a rule supported the policy of the men in power at the Castle, and notably cowered under the despotism of Strafford. It made no real opposition to the confiscations and acts of wrong which marked the reign of the two first Stuarts; but it contained a Catholic or 'recusant' minority, and this resisted the system of Protestant ascendancy that was fast growing up in Ireland. The conduct, too, of Charles I. in the affair of the 'Graces,' in which he gave signal proof of his characteristic duplicity, awakened the independent part of the Irish Parliament to the subjection in which the assembly was kept by Poyning's law. From this time forward a party in it demanded the repeal of that statute. One of the great constitutional questions that arose in the 17th century with respect to the power of the Irish Parliament was whether the English Parliament had a concurrent power to bind Ireland by its legislation. This was a subject of long and angry disputes; but whatever the merits of the controversy were, the English Parliament repeatedly asserted and enforced

its claim, conspicuously so in the case of the Long Parliament, which allotted huge tracts of land in Ireland to English 'adventurers' and soldiers. The quarrel was brought to an end by the Declaratory Act of George I., which expressly vindicated the right of the English or British Parliament. The Irish Parliament was thus made dependent for many years on its superior rival at Westminster. The Irish Parliament almost disappeared in the great civil war, having first turned fiercely against Strafford when the minister fell; it was extinguished by Cromwell. It was, however, restored at the accession of Charles II. to the throne; and it gave full sanction, in the Acts of Settlement and Explanation, to Cromwell's gigantic Irish confiscations. After the Boyne and Aughrim it insisted, but with reluctance in the House of Lords, on the violation of the treaty of Limerick; and, at the instigation and under the direction of British statesmen, it enacted the barbarous code which placed Catholic Ireland in fetters. Before that time an irregular assembly had been convened in Dublin by James II. in 1689. It fairly represented the Irish Catholic people of that revolutionary time; and though much that it did, or tried to do, deserves severe censure, its legislation was by no means as infamous as Macaulay and other writers have stated. The legislation, however, of this assembly, which had been summoned after James lost the crown of England, was declared null and void by the regular Parliaments of England and Ireland, and has never been recognized.

During the first half of the 18th century the Irish Parliament was a degraded and well-nigh powerless assembly. It had attained the largest proportions it ever attained. Its House of Lords was composed of about 200 lay peers, nearly all descendants of settlers of a comparatively recent date, and of some 28 prelates of the Established Church. There were 300 members in its House of Commons, these being largely placemen and dependants of the Castle, or nominees of the new plebeian aristocracy. Not a Catholic and hardly any Presbyterians were to be found in it; its electorate was formed of a few thousand voters of the Protestant people; its borough representation was paltry and venal. Poyning's law had indeed been partly relaxed; the Irish Parliament could initiate 'heads of bills,' as they were called; but, as heretofore, it was under the

control of the Castle and of the Irish and English Privy Councils. Before George III. had become king, however, the Irish Parliament began to quicken with new life. As had happened before, an 'Irish interest,' formed of the leading Irish oligarchy, arose within it, and opposed the 'English interest' in power at the Castle; it acquired powers of taxation as the hereditary revenues of the sovereign began to fail to supply the wants of the country; and its duration—a kind of popular reform—was limited by an Octennial, corresponding to the English Septennial, Act. The 'Irish interest,' known as a *junto* of 'Undertakers,' gradually became a dominant power in the government, and practically ruled Ireland, subject to the men at the Castle. This was some improvement on the old order of things, for the 'Irish interest' had a kind of patriotic feeling; brilliant leaders began to appear in the Parliament, the chief of them being Anthony Malone and Henry Flood. The reign, however, of corruption and subversive activity continued, until the effects of the American war caused a revolution to take place in the Irish Parliament and in all Ireland. The ruinous commercial disabilities, the evil work of the British Parliament, under which Ireland had long laboured, were in part removed; and Grattan, now beginning his illustrious career, united all Irish parties in demanding and extorting legislative independence for his country. The Irish Parliament was set free, so to speak, from its fetters; Poyning's law and the Declaratory Act of George I. were repealed; the Parliament acquired the power of the sword by the repeal of the perpetual Mutiny Act; and the House of Lords regained its full appellate jurisdiction.

The revolution of 1782, as it was rightly called, completely transformed the Irish Parliament. In theory it was made almost coequal with the British Parliament; it could legislate for Ireland as it pleased, subject only to the obsolete royal veto, and to a ministerial veto, in practice nominal; it could appoint or dismiss an executive of its own; it could even have an Irish army and navy. The Parliament, however, was very different in fact from what it was on paper. Composed as it was of men British in race and faith, it usually followed in the wake of the British Parliament; it never attempted to exercise its dangerous theoretic powers; above all, it was kept under the control of the men in office at Westminster by undisguised and profuse corruption. Anomalous

and even bad as this assembly was, Ireland, under its rule, made considerable material and social progress. Some of its legislation was harsh and draconic to the humbler classes; much contravened the doctrines of Adam Smith. Still it did much that was good: the measures it sanctioned with respect to local affairs were on the whole adapted to the wants of the country; and it enacted important laws for the relief of Catholic Ireland, which got rid of all that was worst in the old penal code, if they still left the Irish Catholic partly outside the pale of the state. It had, too, a growing Liberal party in its midst, of which Grattan was the master spirit. The object of this great statesman and orator was to make Ireland in a true sense a nation, by placing the Catholics and Protestants in equality before the law. But the French revolution marred what seemed to be the promise of a new auspicious era. The old dissensions of race and faith revived; the whole community became frightfully disturbed; and the horrible rebellion of 1798, one of the most mournful events in a dark history, led to a hideous and fatal civil war. Pitt seized the occasion to effect the union (1801) which for a long time he had steadily kept in view; and after a fierce and impassioned struggle, marked by much that history must deplore, but also by a grand display of the powers of eminent men, the Irish Parliament, after an existence of five centuries, came to an end. See MacNeill's *The Irish Parliament* (1885); Ball's *Historical Review of the Legislative Systems operative in Ireland to the Union* (1889); Williams's *The Irish Parliament* (1892); and O'Flanagan's *Annals and Traditions of the Irish Parliaments, 1172-1800* (1893).

Irish Regiments. There are four regiments of cavalry and nine regiments of infantry officially connected with Ireland. The infantry regiments are, under the new grouped *depôt*-system, divided into two brigades for recruiting purposes, with *depôts* at Armagh and Clonmel.

Irish Sea, the small but important sea which lies between England and Ireland. It is connected with the Atlantic on the S. by St. George's Channel, and on the N. by St. Patrick's or North Channel. It is on the whole shallow, but descends to over 850 ft. in St. Patrick's Channel.

Irish Terrier. THE, is one of the pluckiest dogs in the world, and is hardly equalled in affection for his master. He enters into the chase of everything and anything with enthusiasm. The Irish terrier is a quite modern

breed, and dates back only to about 1870. His points are as follows:—Head long and rather narrow; punishing jaw; eyes small and dark; ears fairly small, not set on too high; legs straight and strong; feet round and thick,



Irish Terrier.

with good heels; chest narrow, but with good depth of brisket; back strong and straight; tail set on rather high; bones strong; neck long and muscular; coat very hard and straight, shorter on head; colour yellow-red, darker on ears; expression wicked but intelligent. Four clubs devote attention to the Irish terrier.

Irish Times, THE. This, the leading Irish newspaper, was founded in 1859 by Major Lawrence E. Knox, as the organ of the Loyalist and Protestant minority in Ireland, and through all the stormy history of the last half century the *Irish Times* has unflinchingly maintained its uncompromising opposition to the Home Rule movement and the Irish Nationalist propaganda generally. In 1873 the property was purchased by the late Sir John Arnott, Bart., under whose control, in association with the able editorship of Dr. J. A. Scott, the *Irish Times* achieved its present influential position. On the death of Dr. Scott, Mr. Algernon Locker succeeded to the editorship. In connection with the *Irish Times* are published the *Evening Irish Times* and the *Weekly Irish Times*.



Irish Wolfhound.

Irish Wolfhound, THE, is theoretically the oldest breed of dogs

in the United Kingdom, though in practice the modern hound is a recent revival of an almost extinct species, and owes its existence to Captain Graham of Dursley, Gloucestershire, a man who, about 1833, set himself to work to 'restore' the variety. That gentleman's brochure on the Irish wolfhound traces its history from

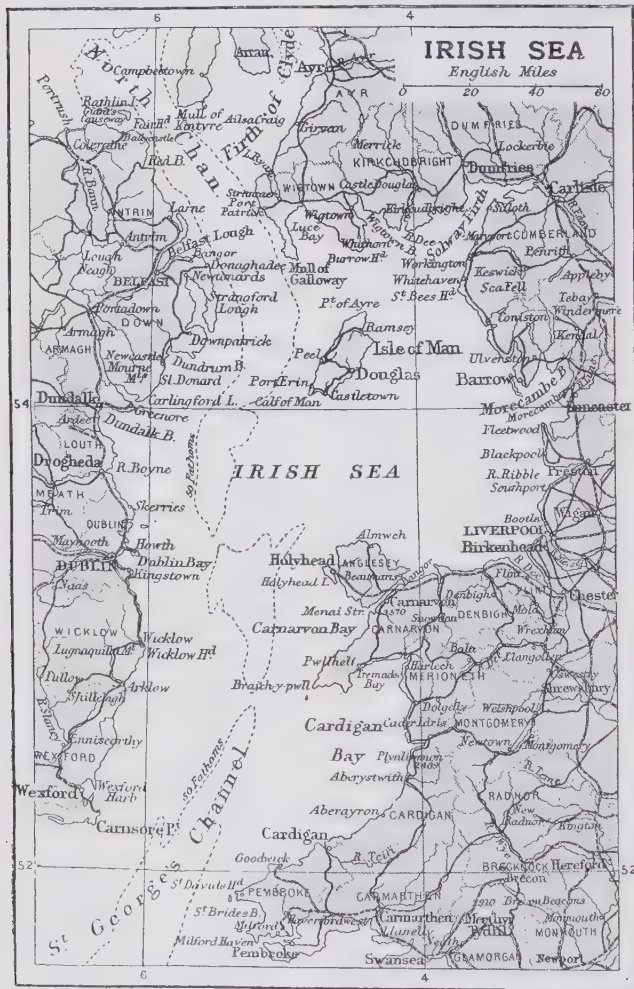
wolf-dog did beat a cruel mastiff, and the bull-dogs too.' The following are the accepted points of the modern Irish wolfhound:—General appearance that of an enormous Scotch deerhound; head long but narrow; muzzle pointed but not snipy; stop very slight; peculiarly long and shaggy eyebrows and beard; ears small

feet large and round; toes well arched and close; nails very strong and curved; coat rough and hard; tail long and slightly curved, and well covered with hair; colour, any colour that appears in the Scotch deerhound, but black is rare and most desirable; height, dogs up to 34 and bitches from 32 inches; weight, dogs from 120 lbs. to 150 lbs., bitches from 90 lbs. to 110 lbs. These dogs are very delicate when young, and difficult to rear to maturity. They are the largest hunting dogs in existence.

Iritis, or inflammation of the muscular curtain which surrounds the pupil of the eye, may spread from adjacent structures, but it may also result from a blow, or from some specific disease such as syphilis. The first noticeable sign is cloudiness over the iris, associated with diminution of the range and speed of pupillary reactions. There is usually some congestion of the conjunctiva, and of the sclerotic around the cornea. Pain may be only slight, but is apt to be more severe towards night. With the effusion of lymph from the inflamed iris there is a constant tendency to the formation of adhesions between the inner margin of the iris and the anterior capsule of the lens. By means of such adhesions the pupil is rendered immobile, and often irregular in outline.

Treatment.—The great aim of treatment is to prevent the formation of adhesions, or to break them down if they have been formed. For this purpose, the pupil must be kept dilated by atropine, which withdraws the iris from contact with the lens capsule. Mercury is also administered when dilatation of the pupil is insufficient to break down adhesions, or when the iritis is of syphilitic origin. Pain may be subdued by cocaine locally, by opium internally, or by a hypodermic injection of morphine. Both eyes should be protected from the light and from alternations of temperature, and counter-irritation or leeches may be applied to the temples if much congestion be present. Should these means fail, iridectomy, or the detachment of adhesions by surgical means, may be necessary. Occasionally iritis is suppurative, in which case early evacuation of the pus is imperative. See EYE, VISION.

Irkutsk. (1.) Division of E. Siberia, extending from the Sayan Mts. to the valleys of the Upper Lena and the eastern tributaries of the Yenisei. It is an elevated country, perhaps fifteen hundred feet on an average, traversed by chains of mountains in the s.,



Bartholomew, Edin'

the earliest times. Stainhurst, writing in 1560, describes it as a 'gre-hound, bigger of bone and limb than a colt.' In 1562 the Irish chieftain Shane O'Neill presented two Irish wolfhounds to Queen Elizabeth, one being jet black and the other pure white. A century later, Evelyn, describing the savage sports of a bear-garden, mentions that 'an Irish

and neatly tucked back, like that of the greyhound; neck rather long, muscular, and well arched, without dewlap; chest very deep; breast wide; back moderately long; loins arched; belly well drawn up; shoulders muscular and sloping; elbows well under; fore legs perfectly straight and muscular; second thigh long and strong; hocks well let down;

as the Kitoi and Tunkun, which trend northwards from the Sayan, while to the N. ranges of moderate height accompany the Lena to the great plateau of N. Siberia. The greater part of the area belongs to the agricultural zone of Siberia, but on the S.E. and the S. there are forests. The temperature is low, both the winter (0° to 4°) and the summer temperature (60° to 66°) being below those of W. Siberia. Besides corn, tobacco, and hemp, a small quantity of flax and vegetables are cultivated. Cattle and horses are very numerous. Gold is washed, but the quantity diminishes year by year. Coal occurs along the Angara and the Upper Oka, but is not worked. Iron is cast at Nikolaievsk, near the mouth of the Oka; and salt is obtained. Furs are still sold in considerable numbers. The native inhabitants, constituting about 21 per cent. of the people, are chiefly Buriats and Tunguses. Area, 287,047 sq. m. Pop. 506,517. (2.) Capital of E. Siberia, and archiepiscopal see, stands on the rapid Angara. Since the fire (1879), a large part of the town has been rebuilt. It contains a few factories and a gold refinery. Pop. (1897) 51,484.

Irlam, eccles. par. and vil., Lancashire, England, $7\frac{1}{2}$ m. S.W. of Manchester, at the joining of the Mersey and the Manchester Ship Canal. Pop. (1901) 4,335.

Irmin, a god-hero of the old Germanic tribes, whose pillar, the Irminsul at Eresburg (Stadtberge) in Westphalia, was the palladium of the heathen Saxons in their wars with the Christianized Franks. Charlemagne destroyed the temple of Eresburg, and removed the pillar to Corbeil (772). Irmin's Chariot was an ancient name for the constellation of Ursa Major.

Irnerius, an Italian jurist who flourished during the early part of the 12th century. He was born, and founded a school, at Bologna, and at the instance of the Countess Matilda directed his attention to the laws of Justinian; he appears to have held some office under Henry v. after 1116. According to ancient opinion, he was the first of the glossators, and was the author of an epitome of the *Novellæ* of Justinian, called the *Authentica*. See monograph by Vecchio (1869), and Savigny's *Geschichte des Römischen Rechts im Mittelalter*, vol. iii. (2nd ed. 1840-50).

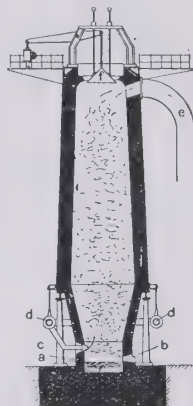
Iron, Fe, 55.9, is a metallic element that has been employed by man from very early times, having been probably first obtained from meteoric stones, in some of which it occurs free. Later it was obtained from its

compounds. The chief that occur naturally, and are valuable as ores from which iron can be profitably extracted, are as follows:—(1.) Oxides. *Magnetite*, or magnetic iron ore, is the oxide Fe_3O_4 . It is a shining black solid that contains 72 per cent. of iron when pure, and is found principally in Sweden (Dannemora), in the neighbourhood of Lake Superior, and in S. Madras. This ore is not smelted to any great extent in Great Britain, but chiefly in Germany and the United States. *Red hematite* is ferric oxide, Fe_2O_3 , containing 70 per cent. of iron, and occurring in black crystals, in dull red masses which may be earthy, or in kidney-like concretions. It is found in Cumberland, in N. America, notably at Lake Superior, and in the United States, where a vast deposit of red fossil ore runs from Clinton in New York State to Birmingham in Alabama. *Brown hematite* is a hydrated ferric oxide containing varying proportions of water, and is of a blood-red to yellowish-brown colour. Of this class the 'rubio,' or Spanish ores, are the most valuable, and being very pure, are imported in immense quantities for the manufacture of the best qualities of steel. Brown hematites are also obtained from the Forest of Dean, Northamptonshire, and the Irish bogs; whilst abroad important deposits are found in France, Germany, and the Canadian and Swedish lakes. (2.) Carbonates. The pure carbonate of iron, *spathic iron ore*, FeCO_3 , contains 48 per cent. of iron, occurs chiefly in Styria and Germany, but is not much used in Britain; though the impure carbonates, in which the ferrous carbonate is mixed with clay in *clay ironstone*, and with bituminous matter in *blackband ironstone*, are largely smelted.

Clay ironstone is found in large quantities in the Cleveland district, and the *blackband* in Lancashire and Staffordshire; but the ore, particularly that from Cleveland, is phosphatic, and gives rise to a low-grade iron. Other ores containing iron are chiefly of interest from the other components present, and are only smelted to prepare special alloys of iron, or after the other components are extracted. Thus *iron pyrites*, FeS_2 , is valuable more for the sulphur and trace of copper it contains; *franklinite*, for the zinc and manganese; and *chromite*, for the chromium; though after the extraction of these constituents the iron oxide that is left may go to the iron smelter. Besides the deposits mentioned above, iron ores of every variety are widely distributed throughout the globe, though sometimes

in quantities or formations that do not pay to work, or at such distances from coal or markets as to be equally unprofitable.

The methods of mining are, owing to the very divergent physical condition of the ores, most diverse, and only an outline of different plans can be given. Thus the magnetite sands simply require removing, lake ores are dredged, the ore is open quarried in Pennsylvania, Spain, Styria, Northamptonshire, etc., whilst in other cases it has to be won by sinking pits and running levels through superincumbent strata, thus requiring the special precautions necessary in mining. (See MINING.) Commercially pure iron is not readily prepared on the large scale directly from the ore; an impure iron, pig iron, containing about three per cent. of carbon as well as other impurities, is almost invariably prepared first, and afterwards refined.



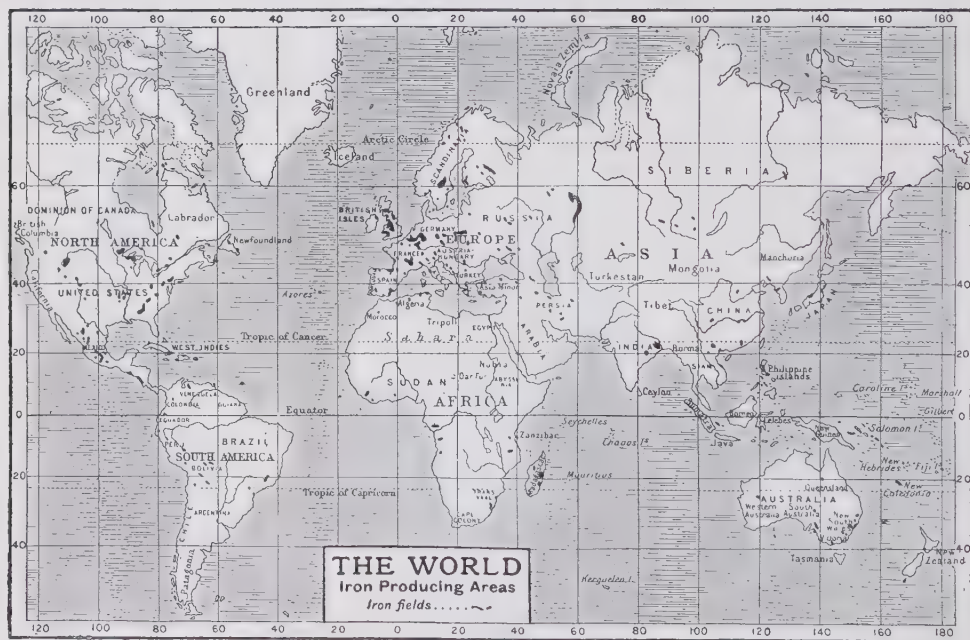
Blast Furnace for Pig Iron.

Preparation of Pig Iron.—With the exception of the hematites, iron ores are usually calcined in heaps or kilns before smelting, in order to remove moisture, carbon dioxide, and sulphur, and to oxidize ferrous to ferric oxide. The ore is then mixed with the calculated quantity of coke or coal to displace the iron, and with a flux (usually limestone) to form a fusible slag with the earthy impurities present, and put into the blast furnace. This consists of a cylindrical tower, from 60 to 90 ft. high, and having a capacity of from 20,000 to 50,000 cub. ft., built of firebrick cased with sheet iron, and tapering internally towards the top and bottom. At the foot are two holes, one, *a*, at the lowest level to run off the molten iron, and the other, *b*, somewhat higher for the slag. Still higher are the openings (three or more) for the tuyères

or blast-pipes, *c*, which are water-jacketed to prevent them from melting, and are connected to a blowing engine by an air main, *d*. At the top of the furnace is a gallery from which the charges are put in, the opening being closed by a cup and cone, *f*, or other valve, to prevent the escape of the furnace gases, which contain about twenty-five per cent. of carbon monoxide, and are led away by a pipe, *e*, at the side, and burnt to heat the blast or boilers, or are used in gas-engines. The cup and cone also plays an important part in the mixing and distribution of the charge in the furnace, of which the figure gives a diagrammatic representation.

position of carbon monoxide, is deposited in the pores of the spongy iron, so that when the iron melts lower down in the furnace the carbon dissolves in it, as well as small quantities of silicon, phosphorus, and sulphur produced by the action of the strongly-heated solid fuel on the compounds of these elements present. At the same time that the iron is being reduced and melted, the limestone loses carbon dioxide, and becomes converted into lime, which unites with the silica, alumina, most of the sulphur, and some ferrous oxide to form a complex silicate or slag, which melts, and with the molten iron runs down to

bination with the iron, the metal is of finer structure, and is harder and silvery. The method of grading commonly used is as follows:—No. 1; No. 2; No. 3; No. 4, foundry; No. 4, forge; mottled; and white—the different varieties being progressively finer in structure and less gray from No. 1 onwards. A gray hæmatite iron contains approximately 3·5 per cent. of graphitic carbon, 2 per cent. of combined carbon, 2 to 3 per cent. of silicon, '03 per cent. of sulphur, and '04 per cent. of phosphorus; whilst in the white iron the proportions of graphite and combined carbon are practically reversed—the silicon falls to 1 per cent. or less,



In modern practice the blast is usually heated to about 550° C. by passage through stoves or chambers, filled with perforated or checker brickwork, that has been heated red hot by the combustion of the waste furnace gases with air, one stove being heated whilst the other is giving up its heat to the blast. When the blast enters the furnace, its oxygen burns with the carbon of the coke, at a point not far removed from the tuyères, to form carbon monoxide, which, ascending to the upper part of the furnace, reduces the ferric oxide of the ore to iron, carbon dioxide being formed. A little below the point of reduction, carbon, obtained by the decom-

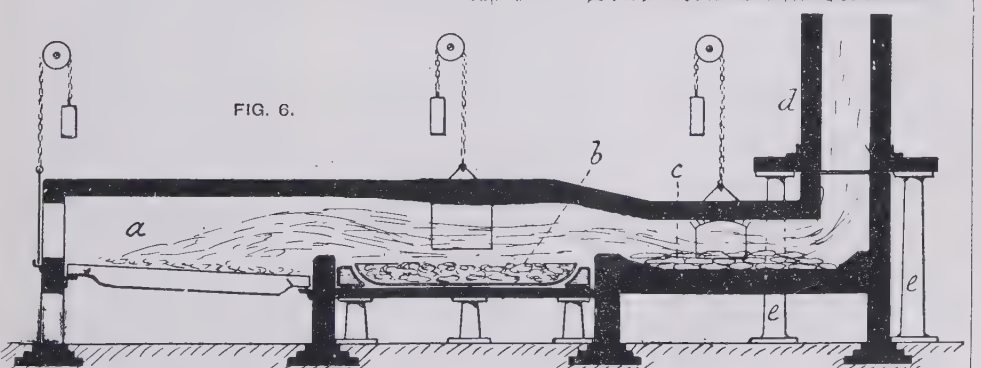
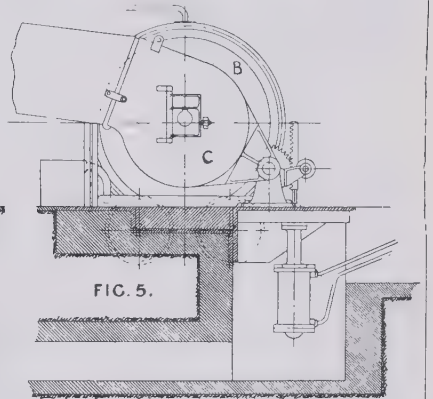
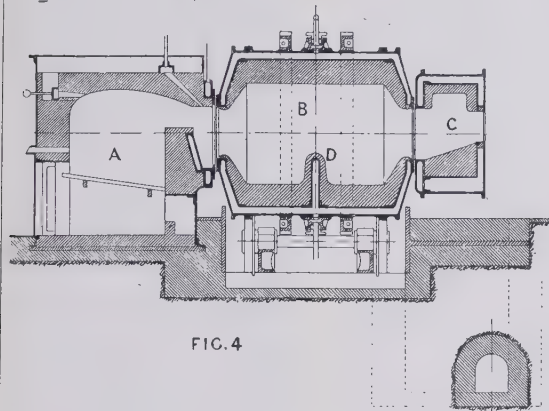
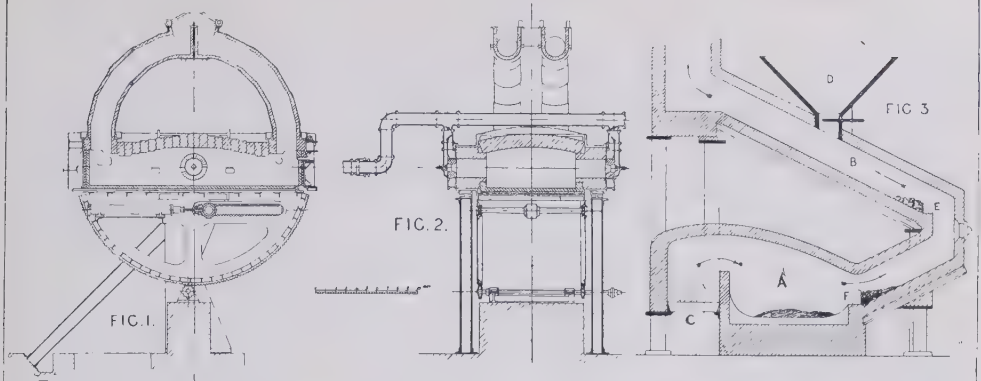
position of the furnace, the slag, as specifically lighter, floating on the iron. As soon as the slag reaches the level of the slag-hole, it runs out as it is formed, the iron being tapped at intervals and run into U-shaped 'pigs' weighing about one cwt. each, whilst the furnace is kept full by the continual addition of ore, coke, and limestone.

The product thus obtained is hard, brittle, and fairly fusible, and contains about three per cent. of carbon, with varying quantities of silicon, sulphur, phosphorus, and manganese. If the carbon is mixed with the iron, the metal is coarsely crystalline and of a gray colour; whilst if the carbon is in com-

position with the iron, the metal is of finer structure, and is harder and silvery. The method of grading commonly used is as follows:—No. 1; No. 2; No. 3; No. 4, foundry; No. 4, forge; mottled; and white—the different varieties being progressively finer in structure and less gray from No. 1 onwards. A gray hæmatite iron contains approximately 3·5 per cent. of graphitic carbon, 2 per cent. of combined carbon, 2 to 3 per cent. of silicon, '03 per cent. of sulphur, and '04 per cent. of phosphorus; whilst in the white iron the proportions of graphite and combined carbon are practically reversed—the silicon falls to 1 per cent. or less,

whilst the proportion of sulphur increases. Ironstone pig iron contains much more phosphorus; in the case of the Cleveland iron about 1·5 per cent. The present price (1905) of Cleveland pig iron is about 53s. a ton, Scotch pig iron being about 57s.

Preparation of Wrought Iron.—Commercially pure or wrought iron is prepared from pig iron by the puddling process. In this a gray forge pig is melted on the hearth of a reverberatory furnace, which is lined with a 'fettling' of ferric oxide. When the iron melts, it is stirred so as to expose the impurities in it as much as possible to the oxidizing action of the flame and of the fettling. As a result, the carbon



Figs. 1 and 2.—Sections of the Roe Puddling Machine.—The general framing consists of two side plates, suspended from a trunnion on each side, carrying the whole machine. The side plates are produced on their lower sides, forming segments of circles, to which the operating racks are secured. Between the side plates are four distance pieces, which form girders from one trunnion to the other. The bottom, consisting of a series of water-cooled parts, supports the working bottom of magnesite brick. The same material is used to line the end and sides up to the wash-line of the chunder. At present the furnace is fired by means of crude oil and blast. The fuel is introduced through the two trunnions, and the flames impinge directly on each other at the middle line of the furnace, thus producing thorough combustion. They then pass to the four converging stacks, two of which are at each end of the furnace. The whole of one end is closed by a door built up of removable sections, which is suspended from a shaft running across the furnace. The sill and lintel are formed with water-cooled convex surfaces (extra heavy pipe). The bottom is rectangular in plan, being about 20 ft. by 8 ft. 8 in. in the clear, while the sides and ends are straight, and stand at right angles to the bottom. The roof is high in the middle to give room for flame development, slopes down to direct the flame against the bottom, and rises again to give room for the wash of the bath at the end. The machine can swing through about 45 degrees on each side of the centre of the trunnions. It is, therefore, a puddling furnace, in which the necessary agitation for producing an intimate mixture of the molten metal and oxides is obtained by allowing them to run downhill, first in one direction and then in the other, and suddenly arresting them at the bottom. The subsequent baling of the iron is produced by precisely the same means.

Fig. 3. The Kent Reverberatory Furnace.—Fresh metal can be introduced without allowing cold air to enter the melting chamber. *d* is a hopper for introducing metal; *e*, movable gate stop for regulating the feed; *a*, is the melting chamber, partly partitioned off from the fire chamber, *c*. The metal in sliding down the flue, *b*, is exposed to the hot gases, and reaches the hearth in a molten condition.

Figs. 4 and 5. Rotary Puddling Furnace used by Messrs. Schneider and Co., Creusot. It consists of three main parts—the hearth, *A*; the revolving chamber, *B*, worked by a steam-engine; the smoke-box, *C*, which leads the waste gases to the steam generator. The revolving chamber, *B*, is fitted with a double iron covering forming a water jacket, and a water-cooled separator, *D*, divides the charge into two parts called 'balls', each 'ball' weighing about 10 cwt. The Creusot rotary puddling furnaces have for their object the production of iron containing no sulphur and no phosphorus, to be used in the manufacture of steel for guns and armour-plates.

Fig. 6. Puddling Furnace.—*a*, The furnace; *b*, the tray containing the iron under treatment; *c*, the heating chamber where the pig iron is heated before being placed in the tray *b*; *d*, the chimney, which is frequently carried on columns, *ee*, so that the heating chamber and flues can be pulled down and renewed without disturbing the chimney.

is converted into carbon monoxide, which escapes and burns, whilst the phosphorus and silicon are also oxidized, and combine with some of the fettling to form a fusible slag, into which the sulphur also enters as ferrous sulphide. As the iron becomes purer it gets pasty, and is made up into balls that are hammered to squeeze out the slag. The product is further improved by rolling into bars, which are cut up, piled into bundles, reheated, and rolled out again into bars or sheets as may be required. (See ROLLING MILLS.) Staffordshire bar iron varies from £6, 15s. to £8, 10s. according to quality. In some cases—as, for example, in that of the fine quality Yorkshire irons, such as Lowmoor—the pig iron is subjected to a preliminary refining before puddling. This refining is carried out by melting the pig iron with coke in a furnace urged by an air blast, so that the oxidation of the impurities is commenced and the puddling proper shortened. Swedish 'charcoal' iron is prepared from a very pure pig iron smelted and refined with charcoal as fuel, and is of exceptionally good quality and high price, being at present at about £18 per ton. Wrought iron can also be prepared by direct reduction of the ore in electric furnaces, and though the process has been elaborated on the commercial scale, the cost of power is in most cases too high to allow the method to be a profitable one. The most important furnaces of this kind are the Stassano and the Keller; but the method has probably much greater scope in the refining rather than in the reduction of iron, as special steels for tools, etc., can be economically prepared in this way.

Wrought iron is a tough, grayish-white metal that is malleable and ductile. It usually has a fibrous structure from the doubling and rolling process, and is with great difficulty fusible, but becomes soft and pasty at a high temperature, so that it can be easily worked and welded. Chemically pure iron is hardly known, but may be obtained by electrolysis of iron salts or by reduction of the oxide by aluminium. Its properties are similar to those of wrought iron, but it is more infusible, the presence of impurities greatly lowering the melting-point, and affecting the other properties. Thus the amount of carbon is the cause of the very marked differences between pig iron, which contains from 4.5 per cent. down to 1.5 per cent.; steel, containing 1.5 per cent. in tool steel down to .25 per cent. in mild steel; and wrought iron, that contains less than this amount. Other impu-

rities have also more or less influence both on the properties of the iron and the state of the carbon. Thus the amount of silicon profoundly alters the fusibility and strength of cast iron; sulphur and arsenic make wrought iron red-short, or brittle when worked hot, whilst phosphorus makes it cold-short, or brittle at ordinary temperatures. Irons containing more than small proportions of other components must be looked on rather as alloys than impure irons. The following are the most important of such bodies, which are chiefly employed in the preparation of steels of special properties: spiegeleisen and ferro-manganese, which resemble cast iron, but contain from 5 to 25 per cent. of manganese in the former, and up to 85 per cent. in the latter. Ferro-chrome, ferro-titanium, ferro-silicon, ferro-tungsten are similar alloys. Pure iron has a sp. gr. of 7.8, a melting-point of 1530° C., a sp. ht. of 11, is the most magnetic of the metals, and has a conductivity for electricity of about .16 of that of copper.

Some explanation of the peculiar properties of the different varieties of commercial iron is afforded by an examination of the way they cool when heated. Curves showing the rate of cooling of nearly pure iron exhibit three arrests in the process—viz. at 850°, 750°, and 660° C. These indicate an evolution of heat which is believed to be due in the case of the two higher temperatures to a change in the iron from one allotropic form to another. If carbon is present, it combines with a portion of the iron to form a carbide, the presence of which affects the temperature of the higher arrest points, and of which the separation is the probable cause of the lowest arrest point. As the properties of the different allotropic forms and the carbide are very different, for example, in the matter of magnetizability, expansibility by heat, elasticity, etc., it is thus likely that the remarkable changes in the properties of commercial iron with respect to temperature and composition are due to the existence of these allotropic forms and the distribution in them of the carbide. This view is strongly confirmed by microscopic examination of polished specimens.

Iron is easily oxidized, forming the magnetic oxide ('smithy scales') Fe_3O_4 , if heated in air or steam, and iron rust, or hydrated ferric oxide, if exposed to the action of air in the presence of liquid water; carbon dioxide and hydrogen peroxide are probably intermediaries. Ferrous oxide, FeO , is a third oxide, and is an unstable black solid produced by

the partial reduction of ferric oxide, Fe_2O_3 . Iron forms two well-defined classes of salts—viz. the ferrous, of pale-green colour, of which ferrous sulphate, or green vitriol, $\text{FeSO}_4 \cdot \text{H}_2\text{O}$, is a well-known example; and the ferric, which, when hydrated, are dull yellow.

Of the iron compounds, ferric oxide is used as a paint and as a polishing powder, magnetic oxide to protect iron in the Bower-Barff process, ferrous sulphide for the preparation of hydrogen sulphide gas, ferrous sulphate in dyeing, tanning, and the manufacture of ink; whilst both ferrous and ferric salts are used in medicine—ferric salts being astringent, and acting as effective styptics, whilst internally iron salts are valuable in promoting the formation of red blood corpuscles, but have also a constipating effect. Ferric hydroxide, when freshly precipitated, is a useful antidote in cases of poisoning by arsenious oxide.

Cast iron, on account of its high resistance to compressive stresses, is most valuable for pillars, bases of machinery, etc.; whilst wrought iron is better suited for positions where it has to undergo tensile, bending, and twisting stresses, as in the moving parts of machinery, bridges, ships, and boilers. Its use, excepting for electro-magnetic purposes, has very much diminished, and its place has largely been taken by mild steel, which has the advantage of having a higher tensile strength and far greater homogeneity. As regards production, Great Britain was, up till 1890, the greatest pig iron producing country; but in that year it was outstripped by the United States, Germany's output also surpassing that of Great Britain in 1903. The production for that year for the different countries having an output of over one million metric tons per annum was as follows:—United States, 18,009,000; Germany, 10,018,000; United Kingdom, 8,811,000; France, 2,828,000; Russia (1902), 2,556,000; Austria - Hungary, 1,427,000; and Belgium, 1,216,000. See STEEL; and for further information, Turner's *Metallurgy of Iron* (1895); Bell's *Principles of the Manufacture of Iron* (1884); Hiorns's *Iron and Steel Manufacture* (1895); Greenwood's *Steel and Iron* (1900); and Campbell's *Manufacture and Properties of Iron and Steel* (1903).

IRON, RALPH. See SCHREINER, OLIVE.

IRON AGE, a term in use among modern archaeologists to denote that stage of culture which is marked by a knowledge of the art of iron-working, and consequently by the general employ-

ment of iron implements. The term does not indicate any special period in universal chronology, as one race may be 'living in its iron age' at the same time as other races are 'living in their stone, bone, or bronze ages.' For example, the Romans had been so long accustomed to the use of iron swords that, as pointed out by Lord Avebury, one of their names for a sword was *ferrum* ('iron'). On the other hand, Tacitus states that their fellow-Europeans, the Fenni, tipped their arrows with bone points because they did not possess iron. All the same, the expression really has to some extent a chronological value. When the sepulchral or other relics of a certain race show that during one period of their existence they were acquainted with the art of iron-working, and when another set of objects ascertained to belong to the same race are made of bone, stone, bronze, or some other material inferior to iron, the logical deduction is that the latter series of objects ought to be assigned to a period of time antecedent to the date of the former. But this deduction does not hold good if the various objects were the property of different races. The conquest of one race by another, or even a successful although temporary incursion, leaves archaeological traces that are apt to mislead the modern inquirer. For instance, in Greenland the early mediæval 'iron age' of the Norsemen was succeeded by the 'stone age' of the Eskimos, by whom the Norsemen were overwhelmed.

The knowledge of the art of working in iron was known to the ancient Babylonians and Egyptians, the latter of whom gave to iron the name of *ba-en-pet* ('the celestial metal'). Curiously enough, iron was at the same time regarded by a certain school in ancient Egypt as conveying a moral taint to those who used it—a taint which could not even be got rid of in the future life. Mespero accounts for the exceptional rarity of iron objects, as compared with bronze, in antiquarian 'finds' in Egypt, by the explanation that 'iron differs from bronze, inasmuch as it is not protected from destruction by its oxide: rust speedily devours it, and it needs a rare combination of favourable circumstances to preserve it intact.' The same argument is also used by Dr. O. Schrader to explain the absence or rarity of iron in ancient sites in other countries.

It is probable that the Jews derived their knowledge of iron from the Egyptians. A passage in Ezekiel (27:12) seems to indi-

cate, however, that the metal was chiefly imported from Tarsish, a region variously localized in Spain, Asia Minor, and Arabia. There are strong indications that Asia was in its 'iron age' long before Europe; and Indian steel was greatly prized among the Greeks. The Homeric poems speak of iron as something so rare and precious that it was stored in the chambers of the rich; and on one occasion (*Iliad*, xxiii. 825) a lump of iron was offered as a prize to be striven for in the games. The iron knives and keys at Mycenæ were assigned by Schliemann to the comparatively recent period of the 6th or 5th century B.C. Hesiod, however, shows that the Greeks used iron for weapons in the 9th century B.C., although bronze was then and long afterwards the recognized metal for defensive armour.

Dr. Schrader points out that the Teutons obtained their name for iron from the Celts; and this, he suggests, connects their first acquaintance with the metal itself. Iron was undoubtedly manufactured by the Celts at an early date. 'The continental Celts are known to have used iron broadswords at the battle of the Anio in the 4th century before Christ,' observes Mr. Elton (*Origins*, p. 122); 'and iron was certainly worked in Sussex by the Britons of Julius Cæsar's time.' The same writer also draws attention (*op. cit.*, p. 231) to the fact that Cæsar's ships were in several respects much inferior to those of the Britons and their allies of N.W. France, two details being that the oak timbers of the Celtic ships were riveted together with iron pins 'as thick as a man's thumb,' and that the Celts used iron chains instead of the primitive rope cables of the Romans. See Schrader's *Sprachvergleichung und Urgeschichte* (Eng. trans. by Jevons, *Prehistoric Antiquities of the Aryan Peoples*, 1890); correspondence by Sayce, Lang, and Leaf in *Academy* of Sept. 22 and 29 and Oct. 23, 1883; Anderson's *Scotland in Pagan Times: The Iron Age* (1883); Engelhardt's *Denmark in the Early Iron Age* (1866), etc.

Ironbark Tree, a name given to certain species of Eucalyptus, some of which are celebrated for the hard and durable nature of their timber. Thus *E. paniculata* is the red ironbark; *E. leucocylon*, the white ironbark; and *E. melanophloia*, the silver-leaved ironbark.

Iron Cross, a Prussian military order, originally instituted by Frederick William III. in 1813, as a reward for eminent service in war, especially in the national struggle against Napoleon. It

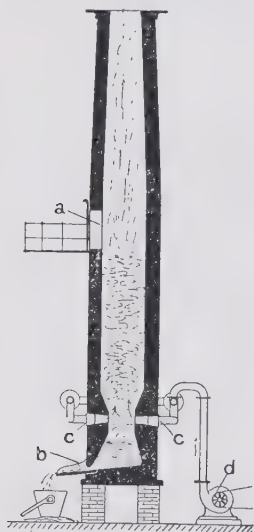
was revived on July 19, 1870, by William I. just before the commencement of the Franco-German war. The decoration is a Maltese cross of iron edged with silver.



Decoration of the Iron Cross.

Iron-founding is the art of making a facsimile of a pattern by impressing it in sand or other material and running molten metal into the impression. The pattern is usually made of wood in one or more pieces, and is a little larger than the required copy, as the metal shrinks in cooling. A mixture of two or more brands of pig iron is used, so as to produce a casting suited to the required purpose, as the different varieties of cast iron vary much in elasticity and strength, and in suitability for machining, etc. The pig iron is in most cases melted in a cupola furnace, which is of the blast-furnace type, and has a circular hearth, with a nearly cylindrical shaft of firebrick cased with iron. The coke, iron, and a little limestone, as flux, are charged near the top, and the metal tapped off at the bottom, the fire being urged by a low-pressure cold blast supplied to one or more tuyères by means of a fan or blower. The molten metal is run into a ladle and poured in as fluid a condition as possible into moulds, which are classified as open sand, green sand, dry sand, loam, and chill, according to the class of work required. Open sand is used for very rough work; green sand, which is a damped, loamy sand, for general work; dry sand, which is more clayey, and after moulding is dried, for large and ornamental work, where few copies are required and special soundness is essential; loam, which is wrought wet and then dried, for large hollow work, such as an evaporating pan; whilst chills are moulds made of iron, which cause the metal when poured in to solidify rapidly, and are used for casting rolls, etc., which require a close

grain and a highly polished, hard surface. Green-sand moulding is carried out in moulding boxes or 'flasks,' which are, as a rule, of iron, and made in two halves so constructed that they may be fitted exactly together. The pattern, about half of which is immersed in the lower half of the box, is rammed round with a refractory sand containing from 91 to 94 per cent. of silica and 6 to 8 per cent. of alumina, which when damped binds into a coherent mass, about half an inch of the sand next the pattern being mixed with powdered coal to act as a facing. The sand is then levelled to the top of the lower box, some dry or 'parting'



Cupola Furnace.

a, Door for charging; b, opening for molten metal; c, c, tuyeres; d, fan.

sand sprinkled on it, the upper box put on and damp sand rammed round the pattern, which must be so shaped and placed as to present no re-entering angles that would prevent it 'drawing'—i.e. the upper box being lifted off the pattern and the pattern lifted out of the lower box without breaking the sand. The parting sand prevents the damp sand in the two boxes sticking together, and the removal of the pattern is facilitated by judicious tapping. A 'gate' or hole is made in a suitable position for pouring in the molten metal, and the upper part of the mould pricked in several places with a wire to allow the escape of air and steam. If hollows, such as the bore of a pipe or steam cylinder, are required in the casting, suitable 'cores,' usually of dried sand, are fixed in the required position; the

mould is then dressed up with tools, dusted with graphite charcoal or French chalk to give a good surface to the casting, the boxes put together again, and the metal poured. If many castings are required of the same pattern, moulding machines can be employed to a certain extent, and save time and labour. Malleable iron castings are made of good quality of white iron, and are afterwards annealed at a red heat in hematite for one or more days, so as to change the hard white iron into a soft grayish iron, which can be bent and hammered. See Bale's *Modern Ironfounding Practice* (1902-5), West's *American Foundry Practice* (10th ed. 1900), and Horner's *Practical Ironfounding* (3rd ed. 1901).

Iron Mask, MAN IN THE. On Nov. 19, 1703, a prisoner who always wore a mask of black velvet died in the Bastille at Paris; on November 20 he was buried. The name in the parish register may be read either Marchialy, or Marchioly. A Count Matthioli, a Mantuan diplomatist, treacherous to Louis XIV., was kidnapped on Italian soil on May 2, 1679, and carried to the dungeon of Pignerol. In 1681 his jailer, Saint-Mars, went to Exiles, taking with him two prisoners, but leaving Matthioli behind. In 1694 Matthioli was carried to the island of Sainte-Marguerite, off Cannes, where Saint-Mars commanded. In April 1694 a prisoner who, like Matthioli, had a valet, died at Sainte-Marguerite. After 1693 the name of Matthioli, often mentioned previously, never occurs in the correspondence to Saint-Mars. In 1698 Saint-Mars carried a masked prisoner, 'your old prisoner,' to the Bastille. That captive died there on Nov. 19, 1703. Was he Matthioli, whose name Saint-Mars often spells 'Marthioly'? The prisoner was buried as 'Marchialy,' or 'Marchioly.' The resemblance of the names 'Matthioli,' 'Marchialy,' 'Marthioly' is the strongest piece of evidence for identifying the Man in the Iron Mask with the Italian diplomat. But the fact of his kidnapping, and even of his place of imprisonment, had long been known to the newspaper readers of Europe. Why, then, this secrecy?

The Man in the Mask, who died in 1703, was either Matthioli or a valet named Eustache Dauger. That is certain; and it is also certain that the legend or popular stories about the Man in the Iron Mask were current about Dauger before Matthioli was captured, and before he came to the Ile Sainte-Marguerite. In 1669 Dauger was in England as the valet of a Huguenot intriguer

—Roux de Marsilly; and Marsilly, if transferred from master to valet, is not unlike Marchialy. Marsilly was conducting a Protestant plot with the ministers of Charles II., while Charles was conducting a Popish plot with Louis XIV. In May 1669 Marsilly was kidnapped on Swiss soil, taken to the Bastille, and tortured to death on June 22. His valet and agent, Eustache Dauger, was safe in England, but by July 19 had been inveigled to Dunkirk, whence he was sent as a prisoner of the highest importance to Saint-Mars at Pignerol. No man was to see him; he must be kept out of earshot of men; Saint-Mars himself must carry food to the wretch, 'and never under any pretence listen to what he may wish to tell you.' 'Already,' says Saint-Mars, 'people believe this prisoner to be a maréchal of France.' In 1675 Dauger acted as valet to the imprisoned financier Fouquet at Pignerol. In March 1680 Fouquet died, and now his other valet, La Rivière, was as carefully secluded as Dauger, lest Dauger should blab his secret to his fellow-servants. In 1681 Saint-Mars went to Exiles, and took 'the two most important prisoners'—not Matthioli, but the two valets. In 1687 one of the two died, and from the increased precautions taken with the other, we suppose him to have been Dauger. La Rivière was dropsical; the valet who died died of dropsy. Saint-Mars was now promoted to Sainte-Marguerite, whither Dauger was carried in a 'hermetically sealed' litter, and a new cell was built for him. In January 1688 Saint-Mars writes that the prisoner is believed to be a son of Oliver Cromwell, or the vanished Duc de Beaufort, never seen after a night battle in Candia (June 1669). Dauger is always spoken of as 'the prisoner of old standing'—*l'ancien prisonnier*. A Protestant preacher, imprisoned at Sainte-Marguerite, scratched messages on his shirt and on a pewter plate, which he threw out of the window. Legend attributes these feats to the Man in the Iron Mask—i.e. to Dauger, Matthioli not yet having arrived at Sainte-Marguerite.

Thus Dauger is the prisoner supposed to be some great one—a son of Cromwell, a marshal, or the Duc de Beaufort—and he is wrongly connected with the writings on linen and on a pewter plate. In 1698 Saint-Mars carried *l'ancien prisonnier* (words applied usually to Dauger) to the Bastille, where the man died in 1703, and was buried as Marchialy, 'aged about forty-five.' Matthioli would have been sixty-three, Dauger not younger than fifty-three, by that

date. These are the facts; the romantic explanations are innumerable. The best romance is *Le Vicomte de Bragelonne*, by Alexandre Dumas. See the *Life of Fouquet*, by Lair (1890), and *The Valet's Tragedy* (1903), where the present writer has made use of the MSS. of the British government for 1668-9.

Iron Mountain, city, Michigan, U.S.A., co. seat of Dickinson co., on the Menominee R., 46 m. N.W. of Escanaba; has iron mining. Pop. (1900) 9,242.

Ironsides, the nickname given to Cromwell's famous regiment, had been originally applied to Cromwell himself. The force consisted of 1,000 horse, recruited from the sturdy, god-fearing yeomen of the eastern counties. The regiment repeatedly distinguished itself, notably at Winceby (Lincolnshire); at Marston Moor, where they scattered Prince Rupert's cavalry; and at Naseby, where they converted a rout into a decisive victory.

Ironton, city, Ohio, U.S.A., co. seat of Lawrence co., on the Ohio, 100 m. S.E. of Columbus, with iron, coal, timber, fire-brick, and cement industries. Pop. (1900) 11,868.

Ironwood, an American tree (*Ostrya virginica*), a deciduous species belonging to the order Corylaceæ. It is sometimes known as the hop-hornbeam, on account of its hop-like fruits. It bears greenish-white flowers in early summer, and is grown in Britain as a hardy tree.

Ironwood, city, Gogebic co., Michigan, U.S.A., 7 m. S.W. of Bessemer; has iron mines. Pop. (1900) 9,705.

Irony, in its original sense, signified the method adopted by Socrates and the Greek sophists of feigning ignorance of a subject in order to induce their antagonist to state his views, and then leading him on from one position to another until the inherent absurdity of his argument was seen. More commonly the term denotes that figure of speech in which a speaker in mockery adopts a view opposed to his own in order to emphasize its folly. The great modern exponent of Socratic irony is Pascal, who in his *Provincial Letters* adopts, as it were, the standpoint of the Jesuitical casuists, and by developing and collating their arguments exposes their immoral tendency. In English literature Defoe and Swift have carried the method to an even greater length. Swift, for instance, in his *Argument to prove the Inconvenience of Abolishing Christianity* (1717) argues that, as freethinkers derive their reputation for wisdom by sneering at Christian doctrines, and their reputation for wit by sneering at

its ministers, they have more to lose than to gain by its abolition. Another remarkable master of dialectical irony is the great Danish thinker Søren Kierkegaard. We apply the expression 'irony of fate' to that not uncommon situation in which a man discovers too late that the means on which he was principally relying for success are precisely those that make success impossible.

Iroquois, one of the great divisions of the N. American Indians. Their original home appears to have been the upper St. Lawrence R., along both banks of which they gradually moved south-westwards into the heart of the Algonquin domain, one stream passing round the north side of Lake Ontario to Lakes Huron and Erie, while another followed a more southern parallel course, the two converging west of Erie, and thus enveloping these three lacustrine basins, and jointly occupying a great part of Upper Canada, the whole of New York, most of Pennsylvania, and considerable tracts in Ohio and Michigan. From Pennsylvania a third stream ramified through Virginia and Tennessee southwards to the Carolinas, but became detached from the main body by the encroachments of Algonquin tribes in Maryland and W. Virginia. Politically the Iroquois enjoyed more coherence than any other N. American people, having at an early period established the famous league of the 'Five Nations'—Mohawks (its founders), Oneidas, Onondagoes, Senecas, and Cayugas, who called themselves Ongwehonwe ('superior men'), and became the 'Six Nations' when they were joined by the Tuscaroras from N. Carolina in 1712. Although some, such as the Monacans and Nottoways of Virginia, held aloof, while others, such as the Hurons and Eries of the Great Lakes, were even hostile, the league, thanks to its admirable political organization, was able not only to hold its ground, but also to extend its power and influence over the Mohicans, the Nanticokes, Shawnees, Mississaugies, and some other Algonquin peoples. During the border warfare the Iroquois mostly sided with the English, and the Northern Algonquins with the French. Since their removal to the reservations, the former have made considerable social progress, nearly all being Protestants and receiving instruction in English, while still retaining their national speech. Including the Cherokees (27,000), the Iroquois family numbered about 40,000 in 1900—30,000 in the United States and 10,000 in Canada.

Irradiation, an optical phenomenon in virtue of which bright luminous surfaces, lines, or points appear to be larger than they really are. It is really a physiological effect, and depends upon the manner in which the eye responds to the stimulus producing vision. See EYE.

Irrational Numbers. See SURDS.

Irrawaddy. See IRAWADDI.

Irridenta, an Italian society which aimed at the liberation from foreign dominion of all territory now outside the political boundaries of Italy in which the inhabitants speak Italian or are of Italian stock, especially the southern districts of Tyrol (Trentino) and Trieste. It was particularly active immediately after 1878, but fell under the suspicion of cherishing anti-monarchical and revolutionary aims.

Irrregulars. In general, the term 'irregular' is applied to bodies of men who serve intermittently as soldiers, but retain in the intervals of such service their civil character and more or less independence of military authority. They may vary in quality from a well-regulated militia to a rude guerrilla force.

In the native army of India, the term 'irregular' was, in the days of the East India Company, applied to corps the organization of which was abnormal, although the soldiers serving in these corps were regular troops continuously under military law. On the reorganization of the Indian army and formation of the Indian Staff Corps after the mutiny, a modification of the 'irregular' system was adopted for the whole army, the number of British officers in a corps being about doubled. The number of British officers in each unit now stands at eleven combatants in each cavalry regiment and infantry battalion.

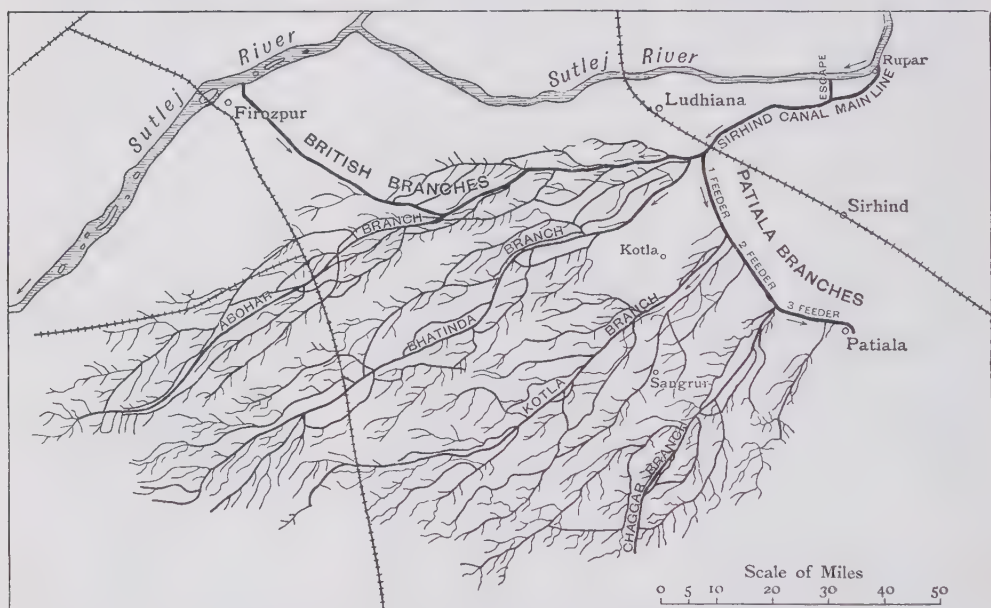
Irresistible, a British first-class battleship (15,000 tons) launched in 1898.

Irrigation. In India, the Ganges Canal, with its many extensions and branches serving Cawnpur, Aligarh, Etawah, and other places, bounded by the Ganges on the north and the Jumna on the south, affords an excellent example of what irrigation can do for a large tract of country requiring artificial water supply. When the Eastern Jumna Canal and the Ganges Canal were made, only the main channels were constructed by the engineers, the distribution channels being left to be made entirely by the cultivators, which led to great evils. On the Agra Canal a complete system of distributaries was carried out as an integral part of the scheme; and, by paying great attention to the

construction of the minor distribution channels, it was found that some of those channels gave a duty of 400 acres per cubic foot per second—i.e. for every cubic foot passing per second 400 acres could be properly irrigated. To work the distributive channels properly, the water should be allowed to flow by a careful system of rotation, in as large volumes and as quickly as possible. In connection with irrigation works in India, even where the supply is never-failing, as in the case of the Ganges, there are the natural difficulties of evaporation, infiltration, or soaking into the banks, apart from the natural barriers and irregularities of the surface, which all help to account

in the soil around the roots of the plants during their growth the requisite degree of moisture, the distribution of certain constituents of the soil and the addition of elements which are wanting are also effected by irrigation. It has, indeed, been established, by experiments on the quantity of nitrogen removed from irrigation waters during their passage through the soil, that water, applied in sufficient quantity, can be made to supply the place of manure. It is necessary to regulate the intervals between irrigations, so that the moisture of the soil which contains the roots of the plants shall not fall below the minimum required. On the character and condition of the

giving the nature and extent of the crops directly benefiting by the great scheme of irrigation. Sir W. Willcocks points out that amongst the problems confronting the irrigation engineer in Lower Egypt are the following: (1) the strengthening and securing of the barrages, or open dams thrown across the heads of the Rosetta and Damietta branches at the apex of the delta some distance below Cairo, so as to secure a constant high-water level during summer; (2) the construction of escapes and supplementary flood canals, so as to irrigate during the summer from the summer canals, and during the high Nile from flood canals, and thus prevent slime deposits;



Indian Irrigation: Sirhind Canal Irrigation System.

for the failures that occasionally follow the most carefully devised schemes of engineers. In a valuable paper read to the Institution of Civil Engineers in 1883, Mr. Patrick O'Mera gave his experience in Colorado. The climate of that country was such that agriculture would be impossible without the aid of irrigation. Up to 1871 all the canals were of small size, and were chiefly for the benefit of riparian lands; about this date irrigation works on a more extensive scale were put in hand, and in about twelve years the amount of land under cultivation in the entire state—155,000 acres—was about trebled. Besides creating and maintaining

soil depend the quantity of water requisite to moisten it to a definite degree, the rate at which the water travels downward to the subsoil, where it is no longer of use, and also the rate at which it becomes dissipated upwards as evaporation proceeds at the surface. For a particularly interesting and instructive account of the irrigation works in Egypt, see 'Irrigation in Lower Egypt,' by Sir William Willcocks, in *Proc. Inst. Civil Engineers*, lxxxvii. and xc. Valuable and extensive information will be found there, not only concerning the network of channels intersecting the delta formed by joining Cairo, Rosetta, and Damietta, but also tables

(3) the obtaining of a flood supply as early as possible in the canals; (4) the drainage of the lowlands, and their restoration by means of basin irrigation to their original fertility; (5) the conversion of the salt plains near the inland lakes into cultivable land; (6) the protection of the Nile dikes during flood; (7) the opening of routes for navigation, so as to convey the produce of the fields cheaply to the markets; (8) the regulation of the water supply.

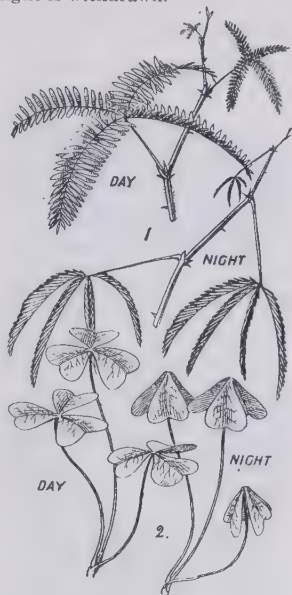
That the enormous dam now built for the purpose of accumulating the Nile waters at Assuan and forming an extensive lake will have a beneficial effect on the

climate, and bring under cultivation considerable tracts of land, cannot be doubted. Sir W. Willcocks says that the slime brought down by the Nile from the detritus of volcanic rocks in Abyssinia must be far richer than that brought down by the Indus from the limestones and sandstones of the Himalayas, as one good deposit of slime could produce six excellent crops in succession without manure, provided the land was ploughed for five of the crops.

Systems of irrigation which might answer in India and in Egypt would be quite valueless in Cape Colony or the Transvaal and Orange River Colony. The first Act of Parliament by which the Cape legislature endeavoured to make it easier for farmers to improve their properties by artificial works was the Water Passage Act of 1876. This gave farmers, who had a right to water from a stream, power to convey that water in a canal through the lands of proprietors on higher ground. There was a second act, passed the following year, and a third act in 1879. In 1880 a fourth act, entitled the 'Irrigation Act Amendment Act,' enabling the government to advance one-fifth of a loan before commencement of works, was passed, the original act having only authorized the government to advance money as the work was done. In many places pumping is a necessity for watering stock, but it is not so much used for irrigation. Among the drawbacks to irrigation in the Cape Colony is the absence of mountains covered with perpetual snow. There is, therefore, no constant supply to the rivers, as there is to the Indus or the Ganges. Then there are no lakes nor deltas, and there is a great scarcity of timber. There are, on the other hand, many alluvial valleys, overfalls or rapids where power is available, and reservoir sites where water can be stored. Irrigation works have also been carried on, both by pumping and gravitation systems, in California, Australia, the United States, Italy, Spain, and other countries. See H. M. Wilson's *Manual of Irrigation* (1893); Willcock's *Egyptian Irrigation* (2nd ed. 1899); King's *Irrigation and Drainage Works in India* (2nd ed. 1905).

Irritability in Plants, a general term for movements arising from variation in turgor, or increase of volume in one part with corresponding diminution in a neighbouring part. These changes are due respectively to expansion and shrinkage of the elastic cell walls and their contents. The cause of this interchange of cell contents is ascribed to os-

motie pressure. These variation movements occur only in foliage and flower leaves, and may be due to mechanical stimuli, or to unexplained internal causes. The sensitive plant (*Mimosa pudica*) is a well-known example of response to mechanical stimulation; and the sleep movements of the native red clover (*Trifolium pratense*) and wood-sorrel (*Oxalis acetosella*) occur when the stimulus of light is withdrawn.



Irritability in Plants.

1. *Mimosa pudica*. 2. *Oxalis acetosella*.

Irtish, or **IRTYSH**, navigable (for nearly 2,000 m.) trib. of the Siberian river Ob, rising in China in the Altai Mts., and flowing N.W. through Lake Zaisan, past Tobolsk, to join the main stream after a course of 2,500 m. Its chief affluents are: r. bk., Bukhtarma, Om, and Tara; l. bk., Ishim, Tobol, and Konda. Navigation is possible for about two-thirds of the year. See OB.

Irun, tn., prov. Guipuzcoa, Spain, 8 m. E. of San Sebastian, on the l. bk. of the Bidassoa. It is a military station and a first-class port of entry. There are iron mines. Pop. (1900) 9,912.

Irvine, par., roy. bur., and seapt. of Ayrshire, Scotland, on riv. Irvine, 11 m. N. of Ayr. The harbour has been greatly improved since 1873. Coal and chemicals are exported. The industries are shipbuilding, steam sawmills, engineering and foundry yards, and chemical works. There is a statue to Burns. It was the birthplace of James Mont-

gomery (1771-1854), and of John Galt, novelist (1779-1839). The Buchanites, a religious sect, were originated here by a Mrs. Elizabeth Buchan (1779). Pop. (1901) 9,618.

Irving, EDWARD (1792-1834), Scottish preacher and one of the originators of the Catholic Apostolic Church, born at Annan, Dumfriesshire. While teaching at Kirkcaldy (1812-18) he became the friend of Carlyle. Licensed as a preacher by the Church of Scotland (1819), he assisted Dr. Chalmers at St. John's, Glasgow, until, in 1822, he became pastor of Cross Street Chapel, Hatton Garden, London. Here his fiery eloquence attracted extraordinary crowds, the sensation being heightened by his book of discourses, *For the Oracles of God* (1823). But his popularity waned after he gave way to mysticism and extravagance of thought and believed himself a prophet. Deposed from the ministry (1832), he formed, with Henry Drummond the banker, a community of Christians, who later became the Catholic Apostolic Church, and are frequently designated Irvingites. The sect does not differ in any of its dogmas from the church catholic, but it recognizes orders of apostles, prophets, evangelists, pastors or 'angels,' etc., and has a ritualistic service and elaborate liturgy. Its communicants number about 50,000, mostly in Britain. See Oliphant's *Life of Edward Irving* (4th ed. 1865); Wilks's *Edward Irving* (1854); Carlyle's *Reminiscences* (ed. Norton, 1887), and 'Essay on Irving' in *Fraser's* (Jan. 1835); *Irving's Collected Works*, ed. by G. Carlyle (1864-5).

Irving, SIR HENRY (1838-1905), English actor, was born at Keinton, Somersetshire. His real name was John Henry Brodribb. He made his debut at Sunderland in 1856 as Gaston in *Richelieu*. He then went to Edinburgh, where he acted for two years (1857-9) in the stock company managed by Robert H. Wyndham. His chance came in 1866, when he secured an engagement at the St. James's Theatre, London, as stage manager to the then lessee, Miss Herbert. One of the first plays produced was *Hunted Down*, and, as Rawdon Scudamore, Irving arrested the attention of the critics. His representation of the part of Digby Grant in *The Two Roses*, at the Strand (1870), brought him increased distinction; but his real fame dates from his engagement with Bateman at the Lyceum in 1871. Thenceforward for upwards of thirty years Irving was intimately associated with this celebrated house. It was his performance as Mathias in *The Bells* which

first established him securely in the estimation of the London playgoing public. His appearance as Hamlet stamped him as a Shakespearean actor of rare distinction, although his reading of the part of Macbeth subsequently gave rise to a lively and even heated controversy. In 1878 Irving himself became lessee of the Lyceum. The association with him from the first of Miss Ellen Terry did much to ensure the success of the enterprise. His first appearance with Miss Terry was at the Queen's Theatre in Long Acre, in *The Taming of the Shrew* (Dec. 26, 1867). Among the plays produced by Irving at the Lyceum Shakespearean productions bulked most largely. In all, the representation was given upon a scale of magnificence, and with an attention to art in every detail, which were previously unknown on the British stage. In 1895 Queen Victoria knighted him. On Saturday, July 19, 1912, Irving gave his last performance at the Lyceum, the *Merchant of Venice* being the play selected. His most noteworthy appearance in London after that date was at Drury Lane, where he produced Sardou's version of *Dante*, written expressly for him, and translated by his son, Mr. Lawrence Irving. Sir Henry died suddenly at Bradford immediately after personating Becket in Tennyson's play, and was buried in Westminster Abbey. About Sir Henry Irving's acting there was a singular magnetic quality which compelled the sympathy of the spectator. He possessed in an eminent degree the power of holding his audience, as it were, in a vice; he swayed and bent them at his will, and readily excited in them a strong interest in the performance. See Brereton's *Henry Irving* (1883); Archer's *Henry Irving* (1883); Fitzgerald's *Henry Irving* (1893); Calvert's *Sir Henry Irving and Miss Ellen Terry* (1897); and Brereton's *The Lyceum and Henry Irving* (1903). For portrait, see p. 52.

Irving, WASHINGTON (1783-1859), American author, was born in New York. At twenty-one he went to Europe for two years, and on his return wrote the *Salmagundi* papers (1806) with the assistance of his brother William and his friend Paulding. In 1809 he published *Knickerbocker's History of New York*, its quaint humour and felicitous style at once rendering him famous on both sides of the Atlantic. In 1810 he became a member of his brother's mercantile firm. In 1815 he went to England in the interests of the house, which, however, failed in 1818. Irving then turned to his pen for support. In the

next few years he wrote *The Sketch Book* (1819-20), *Bracebridge Hall* (1822), a delightful study of old English manners, and *Tales of a Traveller* (1824). During 1826-9 he was in Spain, in the United States diplomatic service. In 1828 appeared his *Life and Voyages of Columbus*. A year later he was sent as secretary of legation to Britain, whence he returned to America in 1832. Shortly thereafter he made an extensive tour in the western states and territories, a record of which was subsequently given in his *Tour on the Prairies* (1835). He was appointed United States minister



Washington Irving.

to Spain (1842-6), and continued his study of Arabian history there, publishing, in 1849-50, *Mahomet and his Successors*. His other works are: *Conquest of Granada* (1829); *Voyages of the Companions of Columbus* (1831); *The Alhambra* (1832); *Legends of the Conquest of Spain* (1835); *Recollections of Abbotsford and Newstead Abbey* (1835); *Astoria* (1836); *Adventures of Captain Bonneville* (1837); *Wolfert's Roost* (1855); *Life of George Washington* (1855-9); and biographies of Goldsmith (1849) and Margaret Miller Davidson (1841). The best edition of his works is the 'Knickerbocker,' published by Putnam (1873). See P. M. Irving's *Life and Letters* (1862); *Life* by C. D. Warner (1881); C. Adams's *Memoir of Washington Irving* (1870).

Irvingites. See IRVING, EDWARD.

Irvington, vil., Essex co., New Jersey, U.S.A., $\frac{3}{4}$ m. w. of Newark, of which it forms a suburb. Pop. (1900) 5,255.

Irwell, riv., Lancashire, England, rises in Rossendale Forest, s.e. of Burnley, and flows s.w. past Bacup, Rawtenstall, Bury, and Manchester, and joins the Mersey at Irlam. The latter part of its course now forms part of the Manchester Canal.

Isaac, the son of Abraham and Sarah, born in their old age. When he had grown up, Abraham was commanded to offer him as a sacrifice; but when both the faith of the father and the obedience of the son had been sufficiently tested, Jehovah intervened to save Isaac's life. He married Rebekah, his cousin, who bore him twin sons, Esau and Jacob. For his peaceful, upright, somewhat commonplace career, marred only by his deception of Abimelech, see Gen. 21-35; also Rawlinson's *Isaac and Jacob* (Men of the Bible Series, 1890).

Isaaci I. (COMNENUS), the earliest of that house to occupy the throne at Constantinople. Chosen emperor by the army (1057), he only reigned two years, when, having abdicated, he entered a monastery, where he died in 1061. He was a ruler of high character and a zealous reformer.

Isaac II. (ANGELUS) was raised to the throne of Constantinople by a revolution (1185), but was a disolute and worthless prince. Compelled to resign by his brother Alexius (1195), he was restored by the crusaders (1203), but was again thrown into prison on their departure, and died there (1204).

Isabela, prov. in Luzon, Philippines, N. of Manila. Area, 4,467 sq. m. It is mountainous and forest-clad. Cattle are reared, and maize, fruits, and tobacco are cultivated. Ilagan is the capital. Pop. (1899) 64,000.

Isabella (1295-1358), daughter of Philip the Fair of France, married Edward II. of England at Boulogne in 1308. She and the king did not agree, and she often sided with his enemies. She was probably privy to his murder, and she and her paramour, Mortimer, ruled England for some time after the accession of her son, Edward III.

Isabella II. See SPAIN.

Isabella of Castile. See FERDINAND V.

Isæus (c. 420-348 B.C.), one of the ten Attic orators, was a native of Chalcis, but came to Athens at an early age. His oratory was forensic, not political. Demosthenes is said to have been his pupil. Eleven of his speeches are extant. Editions: Baiter and Sauppe (1850), Buermann (1883); Eng. trans. by Sir W. Jones (1779). See Blass's *Die Attische Beredsamkeit* (1887-93), Jebb's *Attic Oratory from Antiphon to Isæus* (1893), and Wyse's *Speeches of Isæus* (1905).

Isaiah, the greatest of the Hebrew prophets, was born c. 760 B.C., and died some time subsequent to 701 B.C. He was the son of one Amoz, was called to his prophetic task in the year of King Uzziah's death, and continued to labour during the reigns of Jotham, Ahaz, and Hezekiah. His career is bound up with the fortunes of Jerusalem, both in a religious regard and in its relations to foreign powers, especially Egypt and Assyria. The legend of his having been sawn asunder under Manasseh lacks contemporary authority. The book of Isaiah falls into two parts, separated by the four historical chapters (36-39), and differing greatly in style and standpoint. The first part (ch. 1-35) contains the unquestioned prophecies of Isaiah, and may be divided as follows:—(1) Ch. 1-12, a group of oracles relating to the sin, punishment, and restoration of Judah (Israel is also referred to), and embracing the call of Isaiah and the promise of Immanuel; (2) ch. 13-27, prophecies chiefly upon the neighbouring nations, Babylon, Philistia, etc., with an apocalyptic appendix relating to the restoration of Israel as a whole; (3) ch. 28-35, a prediction of the judgments which must be endured by Israel and Judah, the desolation of their enemies, and the ultimate blessedness of God's own people. Ch. 36-39 is an extract from the history of Hezekiah's reign, and is almost verbatim borrowed from 2 Kings 18-20. Ch. 40-66 seems to be, on the whole, a prophecy of the process and consummation of the deliverance of the exiled Judah from the grasp of Babylon (not Assyria), which deliverance is apparently regarded as imminent, or indeed as in part accomplished.

Until the last quarter of the 18th century A.D. these sixty-six chapters were regarded as an indivisible whole, and as the work of one man. In 1775, however, J. C. Döderlein definitely asserted the non-Isaian origin of ch. 40-66, assigning them to a later age than that of the prophet. After much controversy, lasting almost until the present day, one may now venture to say that Döderlein's theory has won the assent of almost every scholar of note. The language, the historical standpoint, even the religious views of this section, are unmistakably different from those of the first. Of late years, however, a more searching analysis has been applied to both parts, and it is now believed that even ch. 1-35 contain a considerable number of prophecies not related to Isaiah's time at all; but as to

the limits of this later material there is as yet no final unanimity among scholars. In reference to ch. 40-66, frequently referred to as the work of the 'great unknown,' and assigned to exilic or post-exilic times, it has become common to regard ch. 40-55 as due to a different hand from that of ch. 56-66 (5th century B.C.), the two being respectively known as Deutero-Isaiah (6th century B.C.) and Trito-Isaiah. What remains (on any theory) of the real Isaiah is sufficient to show that he was one of the greatest—perhaps the very greatest—of the Hebrew theologians, statesmen, and religious writers; but in the expression of passionate emotion, especially of pathos, he is surpassed by the writer or writers whose prophecies have somehow become attached to his. See Ewald, *Prophecy of the O.T.* (1840 f.; trans. 1876 f.); Delitzsch (1866; trans. 1892); Orelli (1887; trans. 1889); G. A. Smith, *Expositor's Bible* (1888-90); Duhm (1892); Driver, *Men of the Bible* (1893); Skinner, *Cambridge Bible* (1896, 1898); Cheyne, *Polychrome Bible* (1898); Marti (1900).

Isandlwana, or ISANDULA, small conical kopje or hillock in Zululand, British S. Africa, about 10 m. S.E. of Rorke's Drift and on the Tugela R. Here, during the Zulu war, when Lord Chelmsford's column was surprised by Cetshwayo's hordes, the 24th Regiment made its last stand (Jan. 22, 1879).

Isar. See DANUBE.

Isatin, $C_6H_4 \begin{smallmatrix} \text{N} \\ \diagup \quad \diagdown \\ \text{CO} \end{smallmatrix} C(OH)$, is a reddish crystalline solid (m.p. $201^\circ C.$), prepared by the oxidation of indigo by nitric acid.

Isauria, an ancient district in Asia Minor, bounded by Cilicia and Pisidia on the S. It was inhabited by a barbarous race, who in Roman times were notorious as brigands and pirates. In 78 B.C., P. Servilius subdued them; but they soon broke loose again, and were a perpetual source of trouble. In the 3rd century A.D., one of their chiefs, Trebellianus, assumed the title of emperor. He was conquered and executed, but his people were not permanently subjugated. At length an Isaurian, Zeno, became emperor (474-491 A.D.). In the next century, however, they were finally overpowered by the Emperor Anastasius. The Emperor Leo III. (718-741) was also an Isaurian.

Isbarta (anc. *Baris*), tn., Asia Minor, 64 m. N. of Adalia; is situated in the midst of large gardens. The town was visited by a destructive earthquake in January 1889. Pop. 20,000.

Ischæmia, partial bloodlessness or anæmia.

Ischia (anc. *Ænaria*), volcanic isl. of Italy, on W. side of Bay of Naples, 20 m. in circumference. Its natural beauties and its hot springs attract numbers of visitors. Wine and fruit are grown; fishing and straw plaiting are carried on. The island was shaken by earthquake in 474 B.C., 92 B.C., 1302, and in 1883 A.D. Pop. (1901) 27,600. The chief town, Ischia, is on the N.E. coast. Pop. (1901) 7,012. At Porto d'Ischia, half a mile farther north, are the hot springs and the harbour.

Ischl, wat.-pl. of Austria, prov. Upper Austria, 39 m. by rail S.E. of Salzburg, in a charming situation. It is visited for its saline and other baths, and has a villa of the imperial family. Salt is produced. Pop. (1900) 9,646.

Iseghem, tn., Belgium, prov. W. Flanders, 24 m. by rail S. of Bruges; manufactures linen and grows tobacco. Pop. (1900) 12,172.

Iselin, CHARLES OLIVER (1858), United States banker and yachtsman, born, of Swiss-Irish descent, in New York. In 1895 he headed the syndicate which won the America cup, with the cutter *Defender*, against Lord Dunraven's *Valkyrie III*. Again, in October 1899, Mr. Iselin, with Mr. J. Pierpont Morgan, successfully defended the cup, with *Columbia*, against Sir Thomas Lipton's *Shamrock I.*; and he was a part owner of the *Columbia* when she won the twelfth successive contest for the cup, against Sir T. Lipton's *Shamrock II.*, in September and October 1901. He was also part owner of the *Reliance*, which won the cup contests in August and September 1903, against Sir T. Lipton's *Shamrock III*.

Iseo, LAGO D', lake of Italy, in a valley of the Alps, midway between Lago di Garda and Lago di Como. It is 15 m. long, and from 1 to 3 m. across.

Iseran, Alpine pass (9,085 ft.), between the Isère valley and the head of the Arc valley, in French Savoy. Owing to a series of topographical mistakes, it was believed that near the pass there was a peak called Mont Iseran, rising to 13,275 ft. But this mistake was exploded in 1859-60 by Messrs. W. Mathews and J. J. Cowell.

Isère. (1.) Department (area, 3,180 sq. m.) of S.E. France, between the Rhone and Savoy. South and east of the Isère it is very mountainous, while the N. and W. consist of plateaus broken up by valleys. The highest point, the Aiguille du Midi (13,075 ft.), rises on the S.E. frontier. The slopes are partly forest-clad and partly grassy. Coal and iron ore

are mined, and marble and slates are quarried. Gloves, paper, iron and steel goods are manufactured. The Grande Chartreuse liqueurs were made in the now deserted monastery 14 m. N. of Grenoble. Pop. (1901) 568,933. (2.) River in S.E. France, rises on the Italian frontier, and winds W. and S.W. 150 m., through the departments Savoie, Isère, and Drome, to join the Rhone on its l. bk. a few miles N. of Valence. Length, 180 m., of which 100 m. are navigable, though with difficulty.

Isergebirge, short mountain range (2,000-3,000 ft.) of Germany, the W. continuation of the Riesengebirge, divides Prussian Silesia from Bohemia.

Owing to Sarah's jealousy after the birth of Isaac, Ishmael, when about fifteen years old, and his mother were expelled from Abraham's home; but their lives being preserved by the watchful care of an angel, the son took up his residence in S. Canaan, where he became a noted archer, and begat twelve 'princes' (Gen. 25: 12-16). He is the eponymous ancestor of the Ishmaelites; and it is through him that the Mohammedans trace their descent from Abraham, holding that his father and he constructed the Ka'aba at Mecca, where his tomb is pointed out.

Ishogo, Bantu tribe, French Congo, inhabiting the mountains S. of the Ogowe. They are agriculturists, and of superior phy-

Officiis Ecclesiasticis, in which he describes the Mozarabic liturgy that he himself was mainly instrumental in definitively shaping; and a short history of the Goths, Vandals, and Suevi—viz. *Chronicon usque ad Annum v. Heraclii*. His collected works were published by Migne (1850).

Isidorian Decretals. The canon law of the Western Church has two main sources—the decrees of councils and the decretal epistles of various popes. The Isidorian decretals were issued in Spain about 845 by Isidore Mercator, and include some hundred forgeries, amongst others the 'Donation of Constantine.' The controversy regarding them raged furiously at the reformation, but



Ischia, in the Bay of Naples.

Iserlohn, tn., Prussian prov. of Westphalia, 36 m. by rail S.E. of Dortmund, with numerous iron, steel, and other metal works, and manufacture of harness and chemicals, and calamine mines. Pop. (1900) 27,265.

Isernia, tn., Italy, prov. Campobasso, in the Apennines, 78 m. by rail N. of Naples. It is the ancient Æsernia. Pop. (1901) 9,201.

Iseult. See TRISTAN.

Isfahan. See ISPAHAN.

Ishim, tn., Tobolsk gov., Siberia, on riv. Ishim, 120 m. S.S.E. of Tobolsk. It contains spinning and weaving mills, and has a large fair. Pop. (1897) 7,161.

Ishmael, the son of Abraham and Hagar, Sarah's handmaiden.

sique. Though neighbours of the Ashangos and with similar customs, they speak a different language.

Ishpeming, city, Marquette co., Michigan, U.S.A., 15 m. W.S.W. of Marquette, in an iron-mining region. Pop. (1900) 13,255.

Ishtar, or ISTAR. See ASTARTE.

Isidore, ST., archbishop of Seville (600-636), Spanish scholar. The last representative of the ancient Latin learning in Spain, he wrote a sort of encyclopædia, called *Originum seu Etymologiarum Libri xx.*, in which he tries to reconcile the old pagan ideas on æstheticism with the Christian doctrines. He presided at the Councils of Seville (618) and Toledo (633). He also wrote *De*

they were proved to be spurious by Laurentius Valk.

Isinglass, a variety of gelatin prepared by cutting the dried swimming-bladder of various fish into very fine shavings. It is employed in cookery, but chiefly, on account of its peculiar structure, for 'fining' wine and beer.

Isis, ancient Egyptian deity, wife of Osiris, and mother of Horus. She was originally the goddess of the earth, afterwards of the moon. The Greeks identified her with both Demeter and Io. Her worship was introduced into Rome towards the end of the republic, and became very popular; though, because of its licentious orgies, it was more than once checked by the government.

Isis, a British second-class cruiser (5,600 tons), launched in 1896. Since 1743 there have been British men-of-war of this name.

Isis, river. See THAMES.

Iskanderun. See ALEXANDRETTA.

Isla, JOSÉ FRANCISCO DE (1703-81), Spanish man of letters, born at Vidanes in Leon; a Jesuit priest, and a wit and satirist who set all Spain laughing except those who felt his lash. He was a daring preacher, but the buffooneries and ignorance of the Spanish pulpit disgusted him, and he ridiculed them in his world-famous burlesque sermons supposed to be delivered by *Fray Gerundio de Campazas* (1758-70; Eng. trans. 1772), and condemned by the Inquisition. Isla also translated *Gil Blas* into Spanish (1787; 2nd ed. 1878). An edition of his *Obras Escogidas* appeared in 1850 as vol. xv. of 'Biblioteca de Autores Españoles.' See GAUDEAU'S *Les Précheurs Burlesques en Espagne* (1891).

Isla de Pinos. See PINOS.

Islam, the name used by Mohammedans for their religion. See MOHAMMEDANISM.

Islamabad, tn., Kashmir, India, 35 m. s.e. by S. of Srinagar. It stands at the head of the Jhelum navigation, and has a Kashmir shawl industry.

Island is a mass of land entirely surrounded by water. The largest islands are the Old World, the New World, Australia, and probably Antarctica. These may be termed continent islands. Greenland, the next in area, is less than one-fourth the area of Australia, and, along with all islands which possess the same complex structure of the continent islands, may be called a continental or relic island. Other islands are composed of volcanic or coraliferous rocks, or of both. They are formed by the gradual rising above the waves of either material from the interior of the earth, or by the agglomeration, by currents, waves, and winds, of the skeletons of corals and other marine organisms secreting skeletons, mainly calciferous. (See CORAL.) The relic islands may be grouped according to their shape and structure. The Great Antilles and the Sunda Islands are long tectonic mountain islands; Newfoundland is a denudation mountain island; Sokotra and Madagascar are table-land islands; the Baltic islands are plain islands, morainic or glacial polished. Islands may also be grouped according as they are solitary, such as Iceland; or arranged in chains, such as Japan; or in archipelagoes, as in the Aegean, to which island-studded sea this term was first applied. The term continental island has been used to distin-

guish islands rising above the continental shelf from oceanic islands. This would make New Zealand an oceanic island. If islands are to be classified according to the part of the crust from which they arise, they should be divided into islands of the shelf, of the slope, and of the abyssal plateau. It is useful, however, from a biological point of view, to separate the oceanic, volcanic, and coral islands far removed from other lands from those which rise above the shelf and biologically resemble the adjacent continent. Oceanic islands, in the biological sense, are those isolated from the influences of continental life, and possessing peculiar floras and faunas due to this isolation. The proportion of endemic species and genera is large, and the forms are in a number of cases distinctly archaic. See GEOGRAPHICAL DISTRIBUTION.

Island Scots, a body of Highlanders (also known as Redshanks) who settled in Ireland in the reign of Henry VIII. They used to issue from the mountains of Ulster in search of plunder. After defying the Earl of Sussex, they were severely beaten by Shane O'Neill in 1564.

Islandshire, formerly part of Durham co., but now part of Northumberland, England. It embraces the Farne Islands and some districts near Berwick-on-Tweed.

Islay, isl., Argyllshire, Scotland, one of the Inner Hebrides, 13 m. w. of Kintyre. It measures 19 m. by 25½ m. The area is 235 sq. m. Loch Indal penetrates its s.w. side, and almost meets Loch Gruinart, which opens on its w., so that this part is a peninsula, known as the Rhinns of Islay. The chief industries are dairy-farming, stock-raising, and whisky-distilling. Slate is plentiful, and good marble is obtained. Chief town, Bowmore. Pop. (1901) 7,805.

Isle of France. See MAURITIUS.

Isle of Man, Wight, Grain, etc. See MAN, WIGHT, GRAIN, etc.

Isles, LORD OF THE, a title claimed by the descendants of Somerled (d. 1164) of Argyll, who in 1135 obtained a grant of Arran and Bute and other western islands of Scotland from David I., and who seized (1158) the Isle of Man. The descendants of Roderrick, Somerled's grandson, obtained the northern isles, formerly belonging to the king of Man; and John of Isla (d. 1386?), descended from Donald (and therefore surnamed Macdonald), eldest son of Reginald, assumed the title of Lord of the Isles. Donald (d. 1420?), his eldest son, sought, with English

aid, to maintain an independent rule of the isles; and he also, by right of his wife, Mary, daughter of the Countess of Ross, claimed that earldom, but after the battle of Harlaw in 1411 was compelled to surrender his claims. His son Alexander (d. 1449) assumed the earldom by right of its restoration to his mother, and was made justiciar north of the Forth (1438). His son John (d. 1498), fourth and last lord, after causing the government much trouble, gave in his submission in 1476, when the bulk of his lands, with the exception of the earldom of Ross, was restored to him, and he was made a lord of Parliament with the title of Lord of the Isles. Alexander, an illegitimate nephew, assumed the leadership of the clan, and on account of his rebellion the title and possessions of the lordship were forfeited. Donald Dubh, son of Angus, an illegitimate son of John by a daughter of the Earl of Argyll, raised an insurrection, but was defeated and captured by Sir Andrew Wood in 1508. He made his escape in 1543, and, after assisting Lennox in an abortive expedition in the west of Scotland, passed over into Ireland, where he died of fever at Drogheda. The lordship of the isles, annexed inalienably to the crown in 1540, now forms one of the titles of the Prince of Wales. See Gregory's *Hist. of the Western Highlands* (2nd ed. 1881), and Mackenzie's *Hist. of the Macdonalds* (1881). The capture of Donald Dubh forms the subject of a poem by Dunbar.

Isles of the Blest, or FORTUNATE ISLES, were, according to ancient Greek conception, situated at the western extremity of the known world, and were the abode of those happy mortals who the gods decreed should be exempt from death. Homer appears to identify them with the Elysian Fields. Later ages identified them with the Canaries or Madeira. The Avalon of the King Arthur cycle is also a homologue of this classic myth. Compare, too, the Babylonian 'isle of the blessed,' with its four encircling rivers, and the herb of life growing in the midst, and note its similarity to the Biblical story of the garden of Eden. The ancient Egyptians put their Amenet (Amenthes), or world of the dead, in the west. See ATLANTIS, ELYSIUM, PARADISE; also Dr. Johnson's description of the Happy Valley in his *Rasselas* (1759).

Isleworth, par. and vil., Middlesex, England, on l. bk. of Thames, 10½ m. w.s.w. of St. Paul's, is noted for its market gardens and nurseries. There are large soap works. Syon House is a seat of the Duke of Northumberland. Pop. (1901) 30,838.

Islington, met. bor. and par., co. of London, England, 2 m. N. of St. Paul's. It includes the Agricultural Hall, erected in 1861, and the metropolitan cattle market, opened in 1855, and was the residence for some time of Sir Walter Raleigh, Charles Lamb, and the poet Collins. Highbury College, Church Missionary College, the London Fever Hospital, the Great Northern Central Hospital, and Holloway and Pentonville Prisons, are among the modern buildings. Islington returns four members to the House of Commons. Pop. of bor. (1901) 334,991.

Islip, tn., Suffolk co., New York, U.S.A., on Great South Bay; a favourite summer resort; has a fishing trade. Pop. (1900) 12,545.

Ismailia, or **IZMAIL**. (1.) Town, Bessarabia, S.W. Russia, on the Kilias arm of the Danube, about 40 m. from the Black Sea; famous for its fruit, especially apricots. It was taken from the Turks by Suvorov on Dec. 22, 1790, and was finally ceded to Russia in 1878. Pop. (1897) 31,293. (2.) Town, Lower Egypt, on N. shore of Lake Timnah, and on W. side of Suez Canal, where the railway from Cairo meets it. Pop. 4,000. (3.) See GONDOKORO.

Ismailis. See MAHDI.

Ismail Pasha (1830-95), Khedive of Egypt, succeeded his uncle, Said Pasha, as viceroy in 1863, and in 1866 assumed the hereditary title of 'khedive,' and from 1873 possessed virtually sovereign powers. He initiated internal reforms, and spent large sums on roads, railways, telegraphs, and harbour works. In 1874-5 he annexed Darfur and other districts in the Sudan, and endeavoured, without much success, to suppress the Sudanese slave trade. In 1875, under pressure of financial difficulties, he sold 177,000 shares in the Suez Canal to the British government for £4,000,000. But Ismail's reckless expenditure led eventually to a dual English and French control. His arbitrary dismissal of Nubar Pasha's ministry in 1879 led next to the interference of the European governments. Ismail, declining to abdicate, was deposed by the Sultan (June 1879), Tewfik, his eldest son, being proclaimed Khedive.

Ismay, THOMAS HENRY (1837-99), English shipowner, was born at Maryport, Cumberland. He acquired the White Star line of Australian clippers (1867); formed with William Imrie the Oceanic Steamship Company, afterwards the White Star (1868), and in 1871 their steamers began to run between Liverpool and New York. Ismay originated the modern subsidy system (1878) by offering his ships to the government as transports or cruisers in war time.

Ismene, in ancient Greek legend a daughter of Œdipus and Jocasta, and sister of Antigone. See the *Antigone* of Sophocles.

Ismid (anc. *Nicomedia*), tn., Asia Minor, near head of the Gulf of Ismid, is a station on the Anatolian Ry., 50 m. E.S.E. of Constantinople. Owing to the silting up of the gulf, the port has been removed to Daringe, 4 m. distant. It is the residence of Greek and Armenian archbishops, and was the ancient seat of the kings of Bithynia. Pop. 20,000. See NICOMEDIA.

Isobars, lines connecting several places on the globe at which the barometric pressure is the same. See METEOROLOGY and BAROMETER.

Isochronism, the property possessed by any vibrating or oscillating system—e.g. a tuning fork or pendulum, which oscillates in the same time whatever be the range of oscillations. For the two important cases mentioned the isochronism holds only for a certain small range of oscillation. Theoretically the cycloidal pendulum (see CYCLOID) has perfect isochronism through large arcs. In virtue of their practical isochronism, tuning forks, stretched strings, and vibrating columns of air in organ pipes and trumpets give notes whose pitch, which depends on the period, is independent of the intensity. The dynamical condition for isochronism is that the force which resists the displacement is proportional to the displacement. See ELASTICITY, SOUND.

Isoclinal Strata. In most mountain chains and in many plateaus of Palæozoic strata all the rocks have a similar dip; these, being equally inclined in the same direction, are known as isoclinal. Isoclinal strata are only found where the earth's crust has been subjected to considerable tangential pressure.

Isoclinic and Isogonic Lines, terms best known in connection with terrestrial magnetism, are lines each of which is drawn through points at which a certain angle has the same value. In terrestrial magnetism each isogonic line passes through places at which the variation from true north is the same, and each isoclinic line passes through places at which the magnetic dip is the same. There are many other scientific terms formed on the same principle, such as isothermal, isodynamic, isentropic, isochromatic, isoperimetrical, etc., etc., the idea being the equality of a certain property or quantity. These may refer to lines or curves, graphically representing the corresponding state, or they may refer directly to the

state itself. Thus when a thermal system undergoes changes of temperature, volume, and pressure in such a way that there is no change of entropy, then the state is isentropic. If, again, changes take place at constant temperature, the state is isothermal.

Isocrates (436-338 B.C.), one of the ten Attic orators, was a native of Athens, and was taught by Prodicus, Gorgias, and Socrates. He early began to teach the art of rhetoric, first at Chios and afterwards at Athens. From 392 onwards he was occupied with his school. From want of nerve and weakness of voice, he did not appear as a public speaker, but composed speeches on topics of the day, which he published as pamphlets. In these, his one idea was to unite Greece in some common enterprise, preferably war against Persia. Twenty-one of his speeches and nine letters are extant. His style is smooth and ornate even to luxuriance. He carefully observes metrical effects, and avoids hiatus between successive words, and always attains to perfect lucidity and grace of expression, though he lacks the force of Demosthenes. From him Cicero learnt more than from any other of his models. Editions: Text—Baiter and Sauppe (1850), Benseler and Blass (1878); Eng. trans. by Freese (1894). See also Jebb's *Attic Orators* (2nd ed. 1893), and Blass's *Die Attische Beredsamkeit* (4 vols., 2nd ed. 1887-93).

Isocyanides, or CARBAMINES, a class of carbon compounds containing the group -NC, in which alkyls are united to carbon through a nitrogen atom. They are bodies of disgusting odour, and when hydrolyzed yield formic acid and an amine.

Isodimorphous Substances are such as are similarly dimorphous; and in each of their dimorphous forms they are isomorphous. To take an example: oxide of antimony and oxide of arsenic are essentially similar compounds; both of them crystallize in the cubic and also in the rhombic system (dimorphism), and they can form mixed crystals, which belong to either system (isomorphism).

As₂O₃. Sb₂O₃.

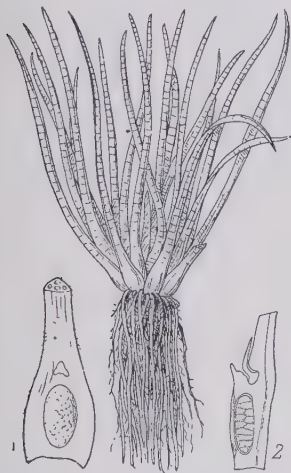
Arsenolite, Senarmontite—cubic. Claudetite, Valentinite—orthorhombic (?).

Now, arsenolite and senarmontite can mix in any proportion, and so can the other two.

Calcium carbonate is dimorphous, crystallizing as calcite and aragonite. Lead carbonate is isomorphous with aragonite (in the mineral cerussite), but no form is known which is similar to calcite. Crystals of cal-

cite often contain, however, carbonate of lead (plumbocalcite), and this proves that carbonate of lead may also crystallize in the same system as calcite, though as yet it has not been discovered as a distinct mineral. These two substances, then, are isodimorphous.

Isoëtes, a genus, mostly aquatic, of club-mosses, which stands almost at the highest point of development among non-flowering plants. The plants have very short stems, from which proceed roots and pointed leaves, each of which bears a sporangium. In the stem is a central vascular bundle, and outside this a cambium-like layer, which produces new tissue external and internal to itself. *I.*



Isoëtes lacustris.

1, Base of leaf, front view; 2, section of leaf base and sporangium.

lacustris is common in the northern parts of Britain, at the bottom of mountain tarns and similar situations.

Isola, tn., Austrian prov. of Istria; stands on a rocky promontory 10 m. s.w. of Trieste. Pop. (1900) 7,500.

Isola Bella. See BORROMEAN ISLANDS.

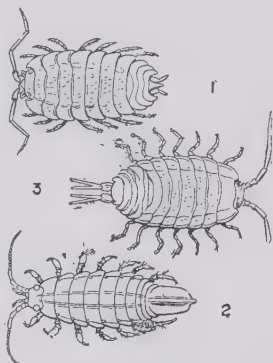
Isola del Liri, tn., Italy, prov. Caserta, 10 m. by rail N.W. of Cassino. Numerous waterfalls supply power for paper and woolen mills and machinery works. Pop. (1901) 8,244.

Isomerism. When the same elements are arranged in the same proportions to form more than one compound, or, in other words, to form compounds of different properties though of the same percentage composition, such compounds are said to exhibit isomerism, to be isomeric, or to be isomerides. Isomerism

is of several kinds. The first, or polymerism, is now hardly considered as true isomerism, and is what exists where one compound, though of the same percentage composition as another, contains two or more times as many atoms in its molecule. Thus benzene is a polymeride of acetylene, both containing carbon and hydrogen in the proportion of twelve parts by weight of the former to one of the latter; but whilst benzene contains six carbon and six hydrogen atoms to the molecule, acetylene contains but two of each. In isomerism of the stricter kind, not only is there the same percentage composition, but also the same number of atoms of the different elements to the molecule, the difference in property being due to a difference in the relative positions of the atoms. This difference of arrangement is of two degrees—(1) that in which the atoms are arranged in quite different groups; and (2) in which they are arranged in the same groups, but the groups are differently disposed. In the first case, compounds of totally different properties result. Thus, ethyl alcohol and methyl ether are both represented by the formula C_2H_6O ; but in the former case the atoms are arranged CH_3CH_2OH , and in the latter CH_3OCH_3 . In the second class of isomerides, the different compounds respond to the same chemical reactions, and thus contain the same groups; but they differ in crystalline form, and especially in their behaviour to polarized light. Such isomeric compounds are called stereo-isomerides, as the difference between them can only be properly represented by solid formulae. They are distinguished by containing one or more asymmetric carbon atoms—i.e. carbon atoms to which are four different atoms or groups. Thus, lactic acid, $CH_3C(OH)(COOH)$, contains a carbon atom attached to a CH_3 , an H, an OH, and a COOH group, and these can be arranged round it in space in two ways, representing the levo- and dextro-lactic acids that actually exist, and rotate polarized light in opposite directions.

Isomorphism. It was discovered by Mitscherlich, on examining the phosphates and arsenates of sodium, that substances of similar chemical composition are isomorphous, or exhibit the same crystalline form. This statement needs some qualification: for example, the angles of crystals of isomorphous substances are not exactly equal; some substances are polymorphous, i.e. occur in more than one crystalline form, and others are isogonal, or, whilst possessing the same crystalline form, have not similar chemical composition. Isomorphous substances,

however, have in general similar properties, and are capable of forming 'mixed crystals' and of 'overgrowing.' Mixed crystals are homogeneous mixtures of the isomorphous substances that are formed in any proportion without altering the crystalline form; whilst 'overgrowing' describes the power one isomorphous substance has of enclosing and continuing the growth of another. Thus, crystals of a mixture of magnesium sulphate and zinc sulphate are of uniform composition throughout, and have practically the same form as the crystals of either salt; whilst a crystal of chrome alum, if immersed in a solution of common alum, will have its growth continued by the common alum just as if the nucleus had been of the same material. Isomorphism has been employed as a somewhat uncertain guide in determining chemical similarities, but is much more useful as a means of mineralogical classification.



Types of Isopoda.

1. *Oniscus asellus*. 2. *Idotea tricuspidata*. 3. *Ligia oceanica*.

Isopoda, a very extensive order of Crustacea, whose members, though usually of small size, are of importance as marine parasites, and in the case of free-living forms as efficient scavengers. The majority live in the sea, but in addition to the fresh-water forms there are not a few terrestrial species, well exemplified by the common 'slater' (*Oniscus*) of gardens. The name is not strictly applicable to all the members of the order, for many have not all their legs similar and equal. The body is depressed and flattened; the first thoracic segment is fused to the head, but there are usually seven free segments; the abdomen is small, and its appendages are usually respiratory in character. Some of the parasitic forms have the body quaintly modified—*Portunion*, for example, which infests crabs,

being quite unlike a crustacean in appearance. The gribble (*Limnoria lignorum*), which attacks submerged timber, is a very destructive form. Very common on weed between tide-marks is *Idotea tricuspidata*; while *Ligia oceanica*, which lives in rock crevices above tide-marks, is more than an inch long, and is unusually large for a British isopod.

Isopogon, a genus of Australian evergreen shrubs belonging to the order Proteaceæ. They bear crowded spikes of brightly coloured flowers, and are worth cultivating under glass. They require a light peaty soil.

Isothermal Line, or **ISOTHERM**, is a line or graph whose characteristic is a constant temperature. Thus in meteorology, the isotherm is a line drawn on a map in such a way as to pass through all places having an assigned temperature. In physics, any graph which gives the law connecting two quantities at constant temperature is an isotherm. See TEMPERATURE, CLIMATE, THERMODYNAMICS.

Isotropy, the term used when a particular physical property of a body has the same value in all directions about a point. The converse term is anisotropy, or ælotropy, the latter being preferable in English. A body may be isotropic as regards one property and ælotropic as regards another. Isotropy may be temporarily destroyed by the action of some force on the body. Suppose, for example, that an iron sphere is perfectly isotropic as regards its conducting powers for heat and electricity, and let it be acted upon by a strong magnetic force in a particular direction; it will at once become ælotropic as regards its electric conductivity and probably its thermal conductivity, while its elastic properties will also become different in different directions. Crystalline structure on any lines but the purely cubical necessarily involves physical ælotropy.

Isouard, NICCOLO (1775-1818), better known as Niccolò, composer of operatic and sacred music, also a pianist, was born at Malta, and after a varied career settled (1799) in Paris. Here, befriended by Boieldieu (later a rival), Méhul, and others, he soon made a reputation for himself. His masterpieces are *Cendrillon* (1810), *Joconde* (1814), *Colin et Jeanette* (1814). The first was performed in nearly all the capitals of Europe, and retained its popularity till lately. He had considerable dramatic tact; his music is bright, free from triviality, and refined; and he had good librettos to work upon. Santley's English version of *Joconde* was heard at the Lyceum, London (1876).

Isphahan, or ISFAHAN, city, prov. Irak-Ajemi, Persia, 218 m. S.E. of Teheran. It stands in the midst of gardens and orchards, and is connected with its residential suburb Julfa by a bridge spanning the river Zayendeh. Under Shah Abbas (1586-1628), who made it his capital, it had a population of about 750,000. Many of the fine buildings erected by him still exist—e.g. the Meidan-i-Shah, or Royal Square; the Mesjid-i-Shah, or Royal Mosque; Chihil-Suton, the Hall of Forty Pillars. In 1722 the city was destroyed by the Afghans. Its chief exports are opium, tobacco, carpets, and rice. The principal manufactures are those of calico, armour, tiles, and pottery. It is the residence of a bishop. Pop. (including Julfa) about 80,000.

Israel. *Name and Racial Origin*.—Israel was the name given to Jacob in connection with a prominent episode in his life, and became the collective name of the nation that sprang from him through his twelve sons. After the revolution under Rehoboam it was adopted as the distinctive designation of the northern kingdom, but subsequent to the Babylonian exile it regained its national significance. The name Jew, however, gradually predominated, although the Maccabean princes engraved 'Israel' upon their coins, and even in New Testament times it was still in use (2 Cor. 11:22, etc.).

According to the tradition embodied alike in history and in prophecy, the ancestors of Israel migrated under Abraham, their aboriginal tribal chief, from Haran in Mesopotamia into Palestine. They were a pastoral clan of North Semitic (and apparently Aramæan) stock. The Hebrew race is represented as consisting of four families—Israel, Edom, Ammon, and Moab—all of which ultimately settled in south-eastern Palestine, and adopted the language of the Canaanites whom they had subjugated (Gen. 9:26). The Edomites were the descendants of Jacob's brother Esau, while the Ammonites and Moabites derived their origin from Lot, Abraham's nephew. The Hebrews probably had connections also with Amalek, Midian, and other seminomadic tribes of the Sinaitic peninsula.

Distinctive Traits.—The Israelites were essentially a pastoral people (Gen. 46:32 ff.). They valued the fleshpots of Egypt, but not its learning, or art, or culture. The idolatrous practices of Canaan appealed to them, but not its ancient civilization. This nation of shepherds, though unsophisticated in their habits of

thought, had a latent genius for commerce, which did not escape the keen eyes of their own prophets (Hos. 12:7; Amos 8:4-6). Previous to the exile at least, tribal prestige was more to them than national unity. But by far the most notable feature about the Israelite is his religion. In this sphere he has been of epoch-making importance in the history of the world.

Israel in Egypt.—Somewhere about 1500 B.C. that branch of the Hebrew group from which sprang the future Israel migrated into Egypt, having obtained leave to feed their flocks in Goshen. Under Egyptian rule they retained their own language, religious rites, and habits of life, and were accounted rude barbarians. On the graves of Beni Hassan, which date from about 2000 B.C., there are representations of wandering Semites, with wives, children, and beasts of burden; and although no certain trace of the Hebrews has been met with on Egyptian monuments, it is possible that the *Apru* mentioned as performing forced labour under Ramses II. are the *Ibhrî*, and that the *Y-si-r-i* of the recently discovered stele of Menepthah are *Israel*, but the identification in either case appears to be hazardous. There is documentary evidence that certain Edomites—i.e. blood relations of Israel—applied for permission to occupy Egyptian territory during the 19th dynasty (c. 1300 B.C.). It was therefore presumably no uncommon thing for the Bedouin of the desert to migrate to the land of the Pharaohs. While Genesis represents the twelve tribes as taking part in this movement to the pasture-lands of the eastern Nile delta, it lays special stress on the connection of Joseph—i.e. Israel in the strictest sense—with Egypt. In view of the silence of the monuments, it has been asserted that Israel was never in Egypt at all; but though the narratives in Genesis cannot claim to be contemporary history, they are doubtless true in outline. That the leading characters are to some extent idealized, and their biographies coloured by the conceptions of a later period, is only what is to be expected.

The Exodus.—Under a new Egyptian king, who 'knew not Joseph,' the Israelites were subjected to cruel oppression. Not only were they forced to toil at public works, but measures were taken to prevent their rapid increase. This harsh treatment was induced by their staunch adherence to their ancestral customs, and by the fear that they might ally themselves with the

enemies of Egypt. But a deliverer arose in the person of Moses. Obligated to flee to the desert of Sinai, owing to his slaughter of an Egyptian whom he found maltreating a Hebrew, Moses became the son-in-law of the priest of Midian, who continued to be his trusted counsellor (Exod. 18:24). At Horeb (Sinai) Jehovah, his father's God, called upon him to lead Israel forth from Egypt into the wilderness with a view to the occupation of Canaan. Moses then returned to Egypt, stirred up the enthusiasm of his compatriots, and formulated his demand that the Israelites should be permitted to depart, their God having ordered them to observe a sacrificial feast at Horeb. This

pledged themselves to serve Him alone and eschew the worship of images. In its spiritual conception of God the Mosaic religion was raised far above the materialistic idea of deity bound up with the polytheistic and sensuous nature-worship of heathen nations. The Israelites were also welded together by the observance of the legal principles instituted by Moses; their God is recognized as the dispenser of justice. If not the lawgiver in the traditional sense, Moses was none the less so in reality, inasmuch as it was upon the rules laid down by him that all subsequent development and codification of the law was based.

Israel in the Wilderness.—On

Ammon. The territory of these tribes had been overrun, and a new Canaanite capital established at Heshbon. Moses secured possession of the land wrested from Moab by Sihon (extending from the Arnon to the Jabbok), and left Balak to appropriate that lying south of the Arnon. He also subdued the children of Ammon who dwelt farther north, and divided the conquered region between Reuben and Gad. Moses then died in view of Canaan, but without entering it, after ordaining his minister Joshua to be his successor in leading Israel to its goal.

Joshua and the Conquest.—There are two separate accounts

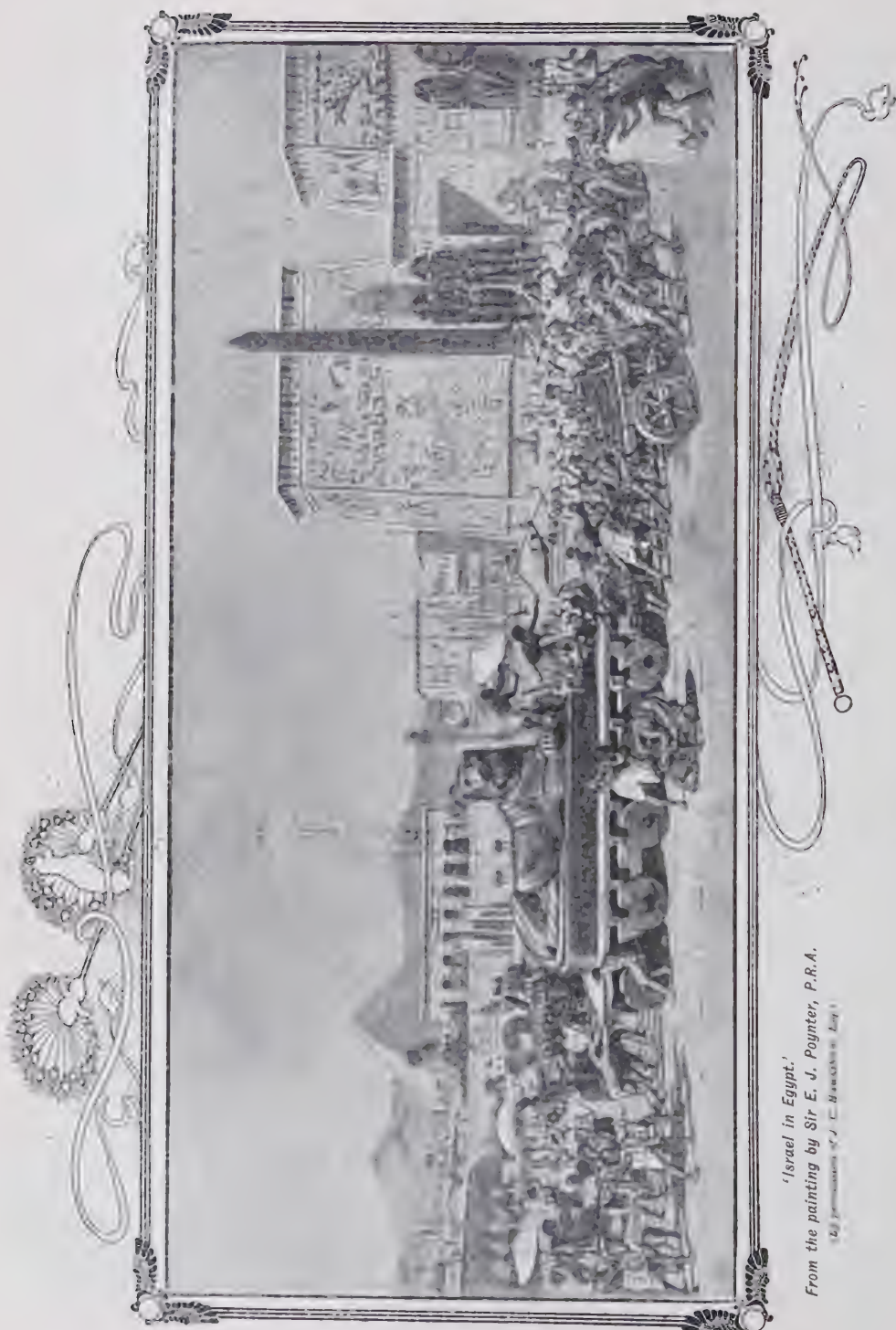


Pharaoh refused; but in the end, owing to the plagues with which God visited Egypt, the Israelites effected their escape, avoiding the direct route to Palestine. In the destruction of the Egyptian war-chariots by the returning flood the Israelites ever afterwards saw the direct interposition of Jehovah (Exod. 14:30).

Moses and his Religion.—The effect of this deliverance, as seen in the (perhaps contemporary) song of Moses, was to create something of a national sentiment. This was still further established when, under the leadership of Moses, the Israelites journeyed to 'the mount of God,' and entered into a covenant with Jehovah, in terms of which they became His peculiar treasure, and

leaving Sinai the Israelites wandered through the wilderness pasturing their flocks, but also keeping in view the conquest of Canaan. Gradually they bore down upon Kadesh (*Ain Kadis*), a central station on the southern border of Palestine. That they failed at once to effect an entrance was due to their own faint-heartedness and distrust of Jehovah. In consequence of this, they had to live in and around Kadesh for practically a generation. During this period they formed alliances with certain tribes (Kenites), and fought with others who were hostile (Amalekites). At last their opportunity came in connection with assaults made by the Amorite king, Sihon, upon their kinsmen Moab and

of the conquest of Western Palestine (Joshua, 2:1-11:9, and the summary of Judges 1). According to the former, the whole people act in concert under the leadership of Joshua; according to the latter, each tribe fights for its own hand. But there is no essential contradiction here. In the first instance there may have been collective action; while afterwards, when the strength of the Canaanites was broken, individual tribes were left to their own resources. The leading events in connection with the conquest were the miraculous crossing of the Jordan under Joshua at Gilead by all except the tribes of Reuben and Gad; the taking of Jericho and of Ai; the league with the Gibeonites, and the



'Israel in Egypt.'

From the painting by Sir E. J. Poynter, P.R.A.

(Engraving of J. E. Harrison, Eng.)

decisive victory of Joshua over the five Amorite kings near Gibeon; Joshua's campaign in the hill country of Ephraim, and his defeat of a northern coalition at Lake Merom; the apportionment of the land among the various tribes; and the removal of the sacred ark from Gilgal to Shiloh. After a while the Canaanites rallied their forces, and held the plains against the Israelites, who were thus confined to the hills. At Joshua's death, however, Israel's position in the land was at least assured, and thereafter the disintegrated Canaanites were gradually pushed back.

The Settlement in Canaan.—A determined effort was made, under Sisera, to reassert Canaanite supremacy. But the Israelites, when summoned to arms in Jehovah's name, rose as men inspired by one spirit, and, led by Barak and Deborah, overcame the Canaanites near Taanach. This settled the question as to which race was to be the dominant one. In many instances, however, some sort of understanding must have been arrived at, as in the period of the judges Israelite and Canaanite are frequently found living amicably side by side—a state of matters that endangered alike the nationality and the religion of Israel. There was nothing like a general extermination of the Canaanites; on the contrary, there was a fusion of the two races. The transformation thus wrought upon Israel was great. From being nomads, they became farmers and merchants; from being strict monotheists, they got into the habit of frequently worshipping at heathen altars; from being comparatively weak, in a military sense, they found themselves able to put a considerable army into the field.

The Age of the Judges.—This was a period of storm and stress, of external and internal feuds, in which individual heroism found conspicuous expression. It presents an alternation of periods of foreign oppression due to Israel's sin, and of deliverance and prosperity under a leader or judge raised up in response to their penitent prayers. There are six greater judges—Othniel, Ehud, Barak, Gideon, Jephthah, and Samson. Although Simeon and Reuben failed to keep their territory, the Israelites, on the whole, extended their occupation of the land. They had, however, others besides the Canaanites to fight. Collisions with their ancient kinsmen, the Ammonites and the Midianites, were brought about through the predatory incursions of these nomads. In both cases the Israelites were victorious, the

Ammonites being vanquished by Jephthah the Gileadite, and the Midianites by the Manassite Gideon of Ophrah. Gideon's exploit in particular had far-reaching results. It brought him not only social distinction, but also administrative authority over Ephraim and Manasseh. This dominion he transmitted to his family, but it soon slipped from

leah met his death; and apparently Jotham, the sole survivor of the massacre at Ophrah, never became king. At this point the history becomes less distinct, and loses itself in the popular, semi-legendary tales of Jephthah and Samson.

Samuel and the Founding of the Monarchy.—The Philistines, who inhabited the southern sea-



their hands. By the murder of his brothers, Gideon's half-Canaanitish son Abimelech made himself master of Shechem, but his violence and lack of prudence soon rendered him obnoxious to Israelites and Canaanites alike. On learning of the revolt against him, he marched upon the city and destroyed it, although it speedily recovered. Soon after, while besieging Thebez, Abime-

lech met his death; and apparently Jotham, the sole survivor of the massacre at Ophrah, never became king. At this point the history becomes less distinct, and loses itself in the popular, semi-legendary tales of Jephthah and Samson. *Samuel and the Founding of the Monarchy.*—The Philistines, who inhabited the southern sea-

a king under whose leadership it could regain national courage. Meanwhile, the people had a wise counsellor in Samuel, an aged seer, who having met Saul, the son of Kish, a Benjamite of Gibeah, 'a choice young man and a goodly,' announced to him his future kingship over Israel. Saul presently proved his fitness to wear a crown by the heroic way in which he rallied the tribes in order to rescue the inhabitants of Jabesh-Gilead from the assault of Nahash the Ammonite. The city was triumphantly relieved, and Saul proclaimed king at Gilgal.

Saul as King.—Even more brilliant success attended the new monarch in the war of independence against the Philistines. This formed the chief business of his reign. The slaughter of their representative at Gibeah by his son Jonathan led them to encamp at Michmash, on the other side of a precipitous ravine. The Israelites seemed to be entrapped, but through the reckless bravery of Jonathan, coupled with the swift onset of Saul's six hundred Benjamites, the Philistines fled panic-stricken, while deserters and waverers rallied to the king's standard. Saul also undertook a prosperous campaign against the Amalekites, who were molesting Judah; but this success was more than neutralized by an unfortunate rupture with Samuel, which seems to have induced a melancholy madness. David, the son of Jesse the Bethlehemite, was introduced to Saul as one whose minstrelsy might soothe his troubled spirit; but after a while his presence aggravated instead of curing the king's disease. The personal magnetism of this brave and gifted youth, his success in war, and his extraordinary popularity, so excited the suspicion and murderous jealousy of Saul that he was driven an outlaw from the court, and ultimately obliged to become the vassal of Achish, king of Gath. Meanwhile, on Mount Gilboa, Saul had been defeated by the Philistines. After seeing his three elder sons fall in succession, he threw himself upon his sword. This victory enabled the Philistines to push back the Israelitish seat of government to the east of Jordan. At Mahanaim, Abner, the leader of Saul's forces, crowned as king his youthful son Ishbaal.

David.—The sovereignty of Ishbaal was recognized by all the tribes except Judah, over which David, with the consent of the Philistines, now became king at Hebron. Civil war broke out in consequence between Judah and the north. Victory inclined steadily towards the house of David; and at length, owing to

the defection of the fiery Abner, the star of Saul's house rapidly declined. As both Abner and Ishbaal soon afterwards met with a violent death, the elders of Israel offered to David the monarchy for which he had adroitly waited and planned. He at once transferred his abode from Hebron to Jebus (Jerusalem), a stronghold which was only now wrested from the Canaanites. He also brought to Zion the ark of God, so restoring it to honour. After a severe conflict with the Philistines, he effected the complete liberation of his people from their yoke, and the tribes at last really possessed the land of Canaan. Under David's sway his own tribe of Judah acquired a new prominence, and the Israelitish nation a splendour which remained an ideal possession for all times. Not that he was yet to have peace. Israel's prosperity was viewed by the neighbouring



Aramæans as a menace to themselves, and they soon adopted hostile measures. Ammon, Edom, and Amalek were severally subdued by David and his general, Joab, with the result that the Israelitish kingdom became the leading military power in Syria. This was, no doubt, partly due to the decline of Assyria and the temporary weakness of Egypt. In point of internal administration also, the Israelitish kingdom made a great advance under David, who 'executed judgment and justice unto all his people.' Owing, however, to jealousy between Israel and Judah, troubles arose which produced several rebellions, notably that led by his own son Absalom. The death of the latter, in an engagement which took place to the east of Jordan, together with the force of David's strong personality, put an end to the revolt. Not long afterwards David died. He was a great man as well as a great

king. Along with some serious weaknesses of personal character, he possessed true nobility of soul. His exceptional qualities of mind and heart are reflected in his poetry. As 'the sweet psalmist of Israel,' he exerted a powerful influence upon the national thought.

Solomon.—The reign of Solomon was characterized by the material splendour so dear to the Eastern despot. He married a daughter of Pharaoh, and, in contrast to the simple ways of his predecessors, introduced the luxurious appointments and customs of foreign courts, including the harem. Like Herod, he had also a passion for building, and erected many fortresses. A monarch with such expensive tastes required a larger revenue than could be raised by the severest taxation. Forced labour was imposed, but this oppressive measure led to popular discontent, and ultimately to revolt. Solomon was so little of a soldier as to permit Hadadezer's general, Rezon, to found at Damascus a kingdom of his own, which afterwards proved a source of danger to Israel. His instincts were those of the administrator and judge. Dividing all Israel into twelve districts, irrespective of tribal connection or racial origin, he set over each of them a responsible official, and so laid the basis of a detailed system of government. Solomon became proverbial for wisdom, justice, and riches. He appears to have derived considerable gains from his commercial and shipping enterprises. This monarch also brought his country into closer contact with the civilized world, thus widening the intellectual outlook of the Israelitish people. Nor can it be denied that he did a great service to religion by erecting the temple, albeit there were incorporated with the sacred cult heathen elements which many pious priests set themselves to eliminate. It was obviously not his deliberate intention to make the temple at Jerusalem the only legitimate sanctuary, although, naturally enough, this was the position which it afterwards attained.

Division of the Kingdom.—The seed of discontent already sown in Solomon's reign blossomed into open rebellion in that of his son Rehoboam. When the latter, against the advice of his older counsellors, harshly declined to lighten the fiscal burdens imposed by his father, the men of Israel chose for their king Jeroboam, the son of Nebat, who had been obliged to flee to Egypt for causing trouble in Solomon's time. Shechem became the capital of the new kingdom. The wrecking thus early of the union formed

under David was, however, no doubt partly due to the old jealousies of the tribes. The breach was religious as well as political. By way of counteracting the influence of Solomon's temple, the ancient sanctuaries at Bethel in the south and at Dan in the north were invested with a new significance. In each of them was placed a staff of priests and an image of Jehovah in the shape of a golden calf. This retrograde step came to be accounted as Jeroboam's special sin. It lost him the sympathy of the Levites, who preferred the temple service, and of the prophetic circles represented by Nathan and Ahijah. Still, Jerusalem was not yet regarded as the sole legitimate sanctuary.

The southern section of the Davidic kingdom ('Judah') was much smaller and weaker than the northern ('Israel'). Indeed, but for Jerusalem and the temple it could scarcely have maintained itself as a kingdom at all. In these it had, however, a priceless possession, which enabled Judah to outlive her more powerful sister state.

Evil Consequences of Disruption.—Civil war went on intermittently, but without any tangible result, during the reigns of Rehoboam and his son Abijah. The invasion of foreign armies was part of the price they had to pay for their unhappy division. Jerusalem, and, according to his monument at Karnak (Carnac), Palestine generally, was overrun and plundered by the Egyptian king Shishak; and in the reign of Asa, Rehoboam's grandson, Judah was saved from Baasha, who had murdered and succeeded Nadab, the son of Jeroboam, only by calling in the aid of Benhadad, king of Syria—a plan which, although effectual for the moment, opened an avenue of danger for the future, not only for Israel, but for Judah as well. Baasha's son Elah was slain by his officer Zimri, but within seven days the latter was in turn compelled to give away to Omri, his superior in command. Omri found a rival in Tibni ben Ginath, and only the death of the latter left him in undisputed possession of the throne. During these rapid and revolutionary changes in Israel, Asa continued to reign quietly and worthily in Judah.

The Syrian Wars.—Syria's leading motive for making war upon Israel was her desire for an outlet to the Mediterranean. In the attempt to secure this and other advantages, she was vigorously opposed by the dynasty of Omri. That ruler built and fortified a new capital on the hill of Samaria, and, according to the Mesha tablet, once more brought Moab into

subjection. He appears to have suffered some reverses at the hands of the Syrians (1 Kings 20:34). Although the Scriptural account of him is very meagre, his importance may be gauged from the fact that on the Assyrian monuments Israel is usually designated 'the land Omri.' Under his son Ahab, the contemporary of Jehoshaphat of Judah, who was probably his vassal, the old feud between the two kingdoms was terminated by an alliance against the Syrians. This was cemented by the marriage of Jehoshaphat's son Joram to Ahab's daughter Athaliah. Ahab sought further to strengthen himself against the Aramæans by espousing Jezebel, daughter of Ethbaal, king of Tyre. Under the influence of his Phœnician wife, Ahab tolerated Baal-worship side by side with the worship of Jehovah, and this betrayal of the 'national treasure' more than neutral-



ized the service he otherwise did by his successes in war. These included the defeat of Benhadad II. at Aphek, the wresting from the Aramæans of the cities previously taken by them, and the negotiation with Benhadad of a commercial treaty, which secured to his merchants a footing in Damascus. During the reign of Ahab's son Joram the Syrians laid siege to Samaria, and retired only because of a reported invasion of their own territory. Aided by Ahaziah of Judah, Joram seized the opportunity of retaking Ramoth-Gilead, where Ahab had fallen in battle (c. 855). But at this juncture the house of Omri met with sudden extinction, at the hands of Jehu ben Nimshi. Thus perished Joram and Ahaziah of Judah in one day. In his contests with Syria, however, Jehu lost the whole of the trans-Jordanic territory. He had also to pay tribute to Shalmaneser II. Under his successor, Jehoahaz,

Israel's distress was still more acute. Hazael, who now reigned at Damascus, overran the whole country as far as Gath, and had to be bribed to retire from Jerusalem, where Joash, the only survivor of David's house, had succeeded the wicked Athaliah. But under Jehoash, the third king of Jehu's dynasty, Israel recovered her lost territory after thrice defeating the Syrians.

The Testimony of the Prophets.—The influence of Elijah and the action of Jehu's dynasty had delivered Israel from Baal-worship, which it had been Ahab's policy to foster, without showing intolerance towards the religion of Jehovah. Still, the new material prosperity that marked the reign of Jeroboam II. (see next paragraph) was accompanied by deep moral and religious degeneracy in the national life. This is clear from the writings of the great prophets of the 8th century—Amos and Hosea in Israel, and Isaiah and Micah in Judah—whose theme was the impending judgment of Jehovah upon the apostate Israelitish nation. They formulated a virtually new conception of Jehovah as not merely the God of Israel, but the righteous Ruler of the world, to whom moral evil, whether within or beyond the ranks of the chosen people, was utterly repugnant, and who delighted not in ritual but in righteousness. In the religion of Jehovah the main thing was not the national element, but the moral. That was independent of the earthly kingdom, and would not share its downfall. A century later this was still more clearly asserted by Jeremiah and Ezekiel.

Interference of Assyria.—Amaziah of Judah wantonly renewed the civil war with Israel, which ended in the loss of his own liberty and the capture of Jerusalem. Under his son Uzziah, Judah entered upon a period of great prosperity, as did Israel also under Jeroboam II., the son of Joash (2 Kings 14:27), by whose prowess the ancient dimensions of the Davidic kingdom were restored from Hamath on the north to the 'wady of the Arabah,' south of the Dead Sea (2 Kings 14:25; Amos 6:14). But the prosperity thus enjoyed by the northern kingdom did not last long. It was due largely to the temporary weakness of Assyria, and vanished upon the accession of Tiglath-Pileser III. (745 B.C.). After a brief reign of six months, Zachariah, son of Jeroboam II., was slain by Shallum ben Jabesh. Within one month the usurper was cut down by a rival, Menahem ben Gadi, who marched 'from Tirzah,' but soon became the vassal of Tig-

lath-Pileser. Menahem's successor was his son Pekahiah, who reigned only two years before being slain by his charioteer Pekah ben Remaliah. The latter, in alliance with Rezon of Damascus, marched against Ahaz of Judah, who had refused to support a western confederacy against Assyria. Contrary to the advice of the prophet Isaiah, Ahaz in his straits called in the aid of Tiglath-Pileser III., who possessed himself of Damascus, deported the inhabitants of Galilee and Gilead, and set up Hoshea as vassal king in Israel. A decade later, upon the death of Tiglath-Pileser, Hoshea listened to the seductions of So, king of Egypt, and revolted from Assyria. When the new monarch, Shalmaneser IV., marched against him, the Egyptians left him to his fate. For three years Samaria offered a gallant resistance, but fell before the assault of Sargon, Shalmaneser's successor, in 721 B.C. The *élite* of the Israelites (27,290 in number) were removed to Mesopotamia and Media, and replaced by colonists from other vanquished territories. These combined with the remnant Israelites to form the composite race known as Samaritans, whose religion, as a mixture of heathenism and Jehovah-worship, reflected the circumstances of their origin. The judgment announced by Amos and Hosea had come, and the kingdom of Israel was at an end.

The surviving Kingdom of Judah.—Ahaz was succeeded by his youthful son Hezekiah (c. 715), who reformed the worship of Jehovah by limiting it to Jerusalem, and by removing the 'high places.' The most conspicuous figure in this religious revival was the prophet Isaiah, who developed with great power of intellect and imagination the thoughts of his predecessors Amos and Hosea. Although not a brave man, Hezekiah hearkened to an embassy from Merodach-Baladan, king of Babylon, urging him to throw off the Assyrian yoke. This exposed him to a great danger at the hands of Sennacherib (701 B.C.). But just as Sennacherib's host was approaching Jerusalem, deliverance came in the form of a pestilence, which carried off 185,000 Assyrians in one night. This, together with the tidings that the Egyptian Tirhakah was advancing against him, led Sennacherib to retire to Nineveh. Isaiah had triumphed; Judah was still, however, Assyria's vassal. Hezekiah's son and successor, Manasseh (686-641), reverted to the retrograde policy of Ahaz, and favoured foreign cults and pagan superstitions. He appears to have enforced his measures by the slaughter of recusants, and tradition has

it that under him Isaiah suffered martyrdom. Manasseh was succeeded by his son Amon, who shared his father's proclivities for idolatry. Only two years after his accession he fell a victim to court intrigue.

Josiah's Reformation (621 B.C.).—The next king was Josiah, the son of Amon. He was only eight years old when he began to reign, yet within ten years there was an end of idolatry in Jerusalem and Judah. Through the cultus heathenish elements had entered into the popular life, and with a view to their effectual suppression the prophetic party, in alliance with the king and the priesthood, now secured the centralization of the Jehovah-worship. From this time the Deuteronomic law-book, embodying the prophetic spirit, and discovered by Hilkiah the priest at the purging of the temple, became the canonical law of the community of Israel. The reform effected under Josiah proved, however, to be only external; it failed to touch the secret springs of the national religious life. This was clear to Jeremiah, who was a leader in the work; and, indeed, the prophets of the period are at one in representing true religion as having reached a very low ebb. Instead of taking warning from the fate of Israel, the people said, 'The temple of the Lord is here;' but this boast was only a cover for rank hypocrisy and carnal security (Jer. 7:1-12).

Decline of Assyria and Downfall of Judah.—The break-up of the Assyrian empire and the rise of the Babylonian were fraught with important issues for Judah. In the last decade of the 7th century Pharaoh Necho II. marched towards the Euphrates, to secure that in the partition of the fallen Assyrian empire the interests of Egypt should not be overlooked. Although he ostensibly attacked Assyria only, Josiah rashly tried to obstruct his march, and fell at Megiddo, where his troops were defeated (608). In this way Judah became tributary to Egypt. Necho carried away as a prisoner Jehoahaz, younger son of Josiah, whom the people had chosen king, and installed in his place his elder brother Jehoiakim (Eliakim), who returned to the idolatrous and despotic ways of Manasseh. The defeat of Necho by Nebuchadnezzar at Carchemish (604) brought Judah under Babylonian instead of Egyptian vassalage. But after three years Jehoiakim, in spite of the dissuasion of Jeremiah, revolted. Thereupon Nebuchadnezzar besieged Jerusalem, and the boy-king Jehoiachin, who had succeeded his father, was forced to surrender. In 597 B.C. along with the cream

of the population, including the prophet Ezekiel, he was deported to Babylon. Zedekiah (Mattaniah) was appointed king over the impoverished remnant. He was foolish enough to join a confederacy against Babylon, with the result that Jerusalem was destroyed, the king made prisoner, and the bulk of the inhabitants removed (587). Many were still left under the supervision of Gedaliah, who, however, within three months, was treacherously murdered. Fearing the vengeance of Nebuchadnezzar, the wretched remnant fled to Egypt, and compelled Jeremiah to accompany them. So ended the kingdom of Judah. Not that even yet the land was turned into a desert: incense was still offered on the site of the temple (Jer. 41:5). The wreck of their temporal ambition was, however, to be the prelude to a revived spiritual life; national disaster meant religious progress. The fall of the Jewish state was Jehovah's victory, and was 'in its effects the greatest step towards Christianity taken since the exodus.'

The Exile and the Return.—According to Jer. 25:11, the Babylonian exile was to last 'seventy years;' but either this is a round number, or we must reckon from the first year of Nebuchadnezzar. Reckoning from the fall of Zedekiah, its actual duration was fifty years. The condition of the exiles was not one of extreme misery. Under Nabonidus some of them were doubtless put to forced labour (Isa. 14:3); but at the first all were permitted to settle in clans, and to 'build houses and plant gardens' (Jer. 29:5). Jehoiachin was ultimately set at liberty, and even high official positions were held by expatriated Hebrews. A large number of them, particularly after the destruction of Jerusalem, decided to settle in Babylonia, but the more spiritually minded among them yearned for restoration to the 'holy city' (Isa. 25:1). During the exile literature was assiduously cultivated, and the scribes as a professional class became a potent factor in the national development. The return of the exiles to Palestine is associated with the name of Cyrus the Persian. In the first year of his reign (538 B.C.) he ordered the restoration of the temple at Jerusalem. As his legate, Sheshbazzar (? = Zerubbabel), a Davidic prince, and Josadac the high priest, together with a caravan of over 40,000 Israelites, besides their servants, proceeded to Jerusalem and laid the foundation of the second temple. Owing, however, to the opposition of the half-caste people of Samaria, building operations were sus-

pended, until, in the second year of Darius (520 B.C.), at the instigation of the prophets Haggai and Zechariah, the work was resumed and carried to completion. The dedication took place about 516 B.C.

Ezra and Nehemiah.—Except for the reference in Ezra 4:6, there is a blank in the history until the seventh year of Artaxerxes Longimanus (458 B.C.), when a fresh band of six thousand exiles returned to Jerusalem. They were under the charge of Ezra, a patriotic scribe of priestly lineage, who carried rich gifts from Babylonia, as well as the king's commission to reform religious abuses in Judah, where things had again reached a low ebb. The Palestinian Jews had begun to intermarry with the Canaanites, and the pure worship of Jehovah was being corrupted by heathen elements. Unfortunately we possess no further details of the great scribe's administration at this time. In 445 B.C., Nehemiah, the cup-bearer of Artaxerxes, obtained leave to proceed to Jerusalem, as governor of Judah, to repair its ruins and relieve the misery of its people. Although a layman, he was at one with Ezra in his religious spirit and aims. His first concern was to restore the walls of Jerusalem. He next set himself to remove the crying grievances of the poor, and to recruit the population of Jerusalem from the surrounding district. Ezra again came forward as a teacher of the law, which he read and explained to the assembled Israelites. The edition of the law-book thus introduced about 444 B.C. was virtually the Pentateuch as we have it, and its distinctly new feature was the so-called priestly code (i.e. Leviticus and the ceremonial sections of Exodus and Numbers), in which the exiled priests had detailed in writing the sacred ritual as practised prior to the destruction of the temple. Upon a second visit to Jerusalem, Nehemiah expelled a grandson of the high priest Eliashib, who had married a daughter of Sanballat. This event had important consequences. Along with other Jews who declined to part with their alien wives, the excommunicated priest sought an asylum in Samaria. They were welcomed by the Samaritans, who appointed the refugee their high priest, erected a rival temple on Mount Gerizim, near Shechem, and (except that they read Gerizim for Ebal in Deut. 27:4) adopted the Pentateuch as their law. Some scholars think that it was in connection with this second visit of Nehemiah that Ezra and his caravan arrived at Jerusalem.

Religion in Israel at the end of the Persian Period.—Little is

known regarding the history of Judæa towards the close of the Persian dominion, but the transportation by Artaxerxes III. (Ochus) of a portion of its inhabitants to Hyrcania seems to indicate that they had joined the Egyptians and Syrians in their revolt from Persia. Certain passages in Isaiah and the Psalms have been regarded as reflecting the calamities that marked the reign of Ochus, but here all is conjectural. In estimating the religious results attained during the Persian period, we are on firmer ground. The people had found in their common worship a strong bond of union. Under the guidance of Ezra and Nehemiah, they had tacitly renounced the pursuit of political independence in favour of the far higher goal of the future glorification of Israel in presence of the heathen. The age was further characterized by a more spiritual idea of worship—thanks to the institution of the synagogue—than had previously prevailed, by keen devotion to the law, by a distinct growth of national sentiment, and by a new consciousness of sin. All this fits in well with the view that many of the psalms are to be dated from the Persian period. Among the defects of the religious life of the age were the externalism which was the natural outcome of the reigning idea of law, and the prostitution of the sacred office of the priesthood, which was the inevitable shadow of the unique supremacy vested in the person of the high priest.

The Ptolemies and the Seleucids.—With the defeat of Darius by Alexander the Great at Issus in 333 B.C., Syria exchanged the Persian dominion for the Greek. To the Jews this was apparently a deliverance (Isa. 24:14 ff.), although what Josephus says (*Ant.* xi. 8) about special favours granted them by Alexander is probably legendary. On the division of the empire after the battle of Ipsus (301 B.C.) Palestine was allotted to Ptolemy I. Under the sway of the first three Ptolemies the Jews enjoyed comparative peace, although, as the natural battlefield between two great powers, their territory was always liable to be overrun. Their dispersion (*diaspora*) throughout the surrounding nations continued, and many remained permanently abroad. Under Ptolemy Philopator (221–204) they suffered much. When, in 198 B.C., Antiochus III. the Great defeated the Egyptians at Paneas, Palestine became part of the Seleucid kingdom. Under his son, Seleucus IV. (Philopator), 187–176, Jerusalem was distracted by party strife between two priestly

families—the Oniadæ, orthodox Jews who favoured the Ptolemies, and the Tobiadæ, who were more in sympathy with the Greek spirit and adhered to the Seleucids.

Contact with Hellenism.—Judaism had now begun to feel the aggressive influence of that Hellenic culture which Alexander's conquests had diffused over the then civilized world; but while the process of Hellenization went on in Judæa as elsewhere, it had there to face a strong antagonistic element. The Hasidæans (Heb. *Hasidim*, 'the pious') constituted themselves the champions of the law. As the Greek party had captured the priestly nobility, they now attempted to Hellenize Jewish life even on its religious side. The high priest Onias III. was superseded by his brother Jason, who purchased from Antiochus Epiphanes the sacred office, together with liberty to set up a gymnasium in Jerusalem. Within three years Jason was in turn supplanted by one Menelaus, who entirely abjured the Jewish faith, and in reward received military aid from Antiochus against the recalcitrant Jason. A false report that Antiochus had died in Egypt led Jason to attack Jerusalem, and Menelaus had to take refuge in the citadel. The Syrian king interpreted these disturbances as a Jewish revolt, and, on his return from Egypt in 170 B.C., plundered the temple of Jerusalem and slew many of the inhabitants. Two years later, his general, Apollonius, devastated the city, and a Syrian garrison was placed in the fortress. An attempt was then made to extirpate Jewish rites and establish pagan customs by force. Sabbath observance and circumcision were forbidden; an idol altar was erected in the temple, and sacrifices offered to Zeus ('the abomination of desolation,' Dan. 9:27); copies of the law, when found, were destroyed. Those who refused to give up Jewish in favour of heathen practices were put to death. Rather than fight on the Sabbath, no fewer than a thousand let themselves be slain. But, unless the Jews were to be exterminated, such a policy had to be abandoned, and naturally there arose a fierce religious war.

The National Rising under the Maccabees.—The revolt was led by Mattathias, an aged priest, who, with his five sons, was joined by all who were ready to fight, even upon the Sabbath if necessary, for their ancestral faith. Acting on the aggressive, they began to stamp out heathenism from the land. At his death (166 B.C.), shortly after the war broke out, Mattathias bequeathed

the leadership to his son Judas, surnamed Maccabæus (= 'hammerer'; hence the name Maccabees as applied to his sons and descendants). This war of independence stands out as the most heroic episode in Israelitish history. Judas proved himself an ideal general. After defeating in succession the Syrian commanders Apollonius, Seron, and Gorgias, he overcame the viceroy Lysias at Beth-zur, and proceeded to cleanse, fortify, and re-dedicate the temple of Jerusalem (165 B.C.). The moral effect of all this was very great; the Hellenistic party was overawed, and the adherents of the law were greatly heartened. Soon afterwards Judas had again to meet Lysias in the field, and was forced to secure himself in the temple fortress. The prospect was ominous enough for the Jewish insurgents, when Lysias, obliged to return to Antioch in order to retain the regency, unexpectedly granted them by treaty the free exercise of their religion (162 B.C.). The Hasidæans saw no cause for further warfare, but Judas and his brethren determined to fight for political independence as well. Again the Syrians were defeated, and Nicanor was slain at Adasa, in 161 B.C., on the 13th Adar (March), afterwards kept as 'Nicanor's day.' But a fresh army was instantly sent to Judæa under Bacchides, and Judas, overcome by sheer weight of numbers, fell at Elasa in April of the same year. In spite of this irreparable disaster, the cause of Jewish self-government continued to advance under the leadership of Jonathan, the brother of Judas. If not specially distinguished as a soldier, he excelled as a diplomatist, and, by taking skilful advantage of the troubled situation in Syria, secured for himself in 153 B.C. the high-priesthood, and in 150 B.C. the dignity of 'captain and governor of a province' (1 Macc. 9:65). As, however, Demetrius II. failed to fulfil his promise to remove the Syrian garrisons from Judæa in return for Jonathan's services in quelling an insurrection in Antioch, the latter espoused the cause of his rival Antiochus. But Jonathan was decoyed into Ptolemais, made prisoner, and eventually slain (143 B.C.). Simon now became leader of the Maccabean party, and allied himself with Demetrius. A capable military commander, he not only got the better of Tryphon, general of Antiochus, but forced the Syrian garrison in Acre to capitulate (142). Then he demanded and obtained complete independence for the Jews. The first year of Simon's reign was adopted as the commencement

of a new era (Seleucid year 170 = 143-142 B.C.); the first Jewish coins were struck; and the 'yoke of the heathen was taken away.' Under his wise administration the country enjoyed a period of peace and exceptional prosperity. Through the perfidy of Antiochus VII. (Sidetes), Simon was once more involved in war; but his sons Judas and John, to whom he entrusted the campaign, routed the Syrians. In 135 B.C. Simon and two of his sons were treacherously slain in the castle of Dok, near Jericho, by his son-in-law Ptolemy, who coveted the supreme power. But Simon's third son, John Hyrcanus, governor of Gazara, anticipated him in the occupation of Jerusalem, and assumed the high-priesthood.

The Hasmonæan Dynasty.—The reign of John Hyrcanus (135-105) was at first a troubled one, owing to the siege of Jerusalem by Antiochus VII., who imposed oppressive conditions of peace; but after the death of the Syrian monarch in B.C. 123, he successfully asserted his independence, and restored the Jewish kingdom to its ancient dimensions. This outward prosperity, however, was counterbalanced by much internal discord. It was in the reign of Hyrcanus that acute opposition was developed between the Pharisees and the Sadducees as political and religious parties; and his secession from the former to the latter served to emphasize the cleavage. On the death of Hyrcanus the crown was usurped by his son Aristobulus, who, after annexing Ituræa, in a fit of suspicion slew his brother Antigonus, and died of remorse in 104 B.C., having reigned only one year. He was succeeded by his brother Alexander Jannæus (104-78), a warlike prince who possessed himself of most of the towns on the Philistine coast and of the trans-Jordanic region. His Hellenistic sympathies brought him into collision with the Pharisees; and upon the populace, which rose in revolt, he took a bloodthirsty revenge. The sceptre now passed to Salome Alexandra, the widow of Jannæus. For nine years (78-69) she ruled with tact and shrewdness. From the first she put herself in touch with the Pharisees, whose policy she adopted as regards internal administration, while retaining control of external affairs. Her elder son, Hyrcanus II., a weak nonentity, was appointed high priest. Her younger son, the energetic Aristobulus II., who disliked the Pharisees and resented his exclusion from public affairs, seized several fortresses, and with an army menaced Jerusalem. At this juncture Alexandra died, and Aristobulus soon succeeded in rel-

egating Hyrcanus to private life. The kingdom of the Maccabees was now tottering to its fall. For selfish ends of his own, a certain Idumæan, named Antipater, desired the restoration of the pliable Hyrcanus, whom he induced to place himself under the protection of the Arabian king, Aretas. In this dispute about the succession the Romans came also to be mixed up, as both parties appealed to Scæurus, whom Pompey sent as his legate to Syria in 65 B.C. The matter ended in the siege of Jerusalem by Pompey, and the loss of Jewish independence. Hyrcanus II. was appointed high priest and vassal prince (not king) over a diminished principality (63 B.C.). Patriotic Jews, who felt that Hyrcanus was only the tool of Antipater and the Romans, supported Alexander, the son of Aristobulus, in his vain attempt to secure the throne (57 B.C.). In order to dissolve the national unity, the proconsul Gabinius divided Palestine into five districts; but the spirit of revolt still lived on. In three successive years (56-54) as many ineffectual attempts were made by the Hasmonæans to assume power. Meanwhile, as their house hastened to its fall, the influence of the hated Idumæan steadily increased. In return for services against the Egyptian Ptolemy, Cæsar appointed him procurator of Judæa (47 B.C.); and as a further step to power, Antipater made his eldest son Phasael governor of Jerusalem, and his second son Herod governor of Galilee. In 41 B.C., in face of considerable opposition, the two brothers were appointed by Antony tetrarchs of Judæa. A year later Antigonus, the only surviving son of Aristobulus, was set up as king by the Parthians. Phasael was made prisoner, and committed suicide, but Herod escaped, and with the aid of the Romans secured the throne of Judæa (37 B.C.). With the execution of Antigonus by Antony in the same year, the Hasmonæan dynasty came to an end.

Herod the Great (37-4 B.C.).—Two things Herod deemed essential to the establishment of his power—the favour of the Romans, and the extirpation of the Hasmonæans. In the former object, by dint of natural capacity, cunning, audacity, and *savoir faire*, he succeeded wonderfully, even in very difficult situations, as, for example, when, after the battle of Actium, he had to face Octavian, whom he had opposed in the interests of Antony; the latter he carried out gradually, with the most callous cruelty. Thus perished in succession the high priest Aristobulus, the aged Hyrcanus II., Herod's own wife Mariamne,

and her mother Alexandra. Latterly this bloodthirsty tyrant found his victims among his own sons. About 7 B.C. Alexander and Aristobulus were strangled at Sebaste, and within a week of his own death he ordered the execution of Antipater, son of his first wife Doris, and the only one of his victims that deserved his fate. As a lover of pagan culture and a diligent builder of forts and cities, Herod was a notable figure in the Greek and Roman world of his time; while as the rebuilders on a magnificent scale of the temple at Jerusalem, he did something to recommend his dynasty even in the eyes of the Jews.

End of the Jewish State.—In accordance with Herod's will, his kingdom was divided between his three sons Antipas, Philip, and Archelaus. To Antipas, 'that fox' who knew so well how to curry favour with the Roman emperors, was given Galilee and Peraea; Philip received the most northerly part of the trans-Jordanic territory, together with Paneas (Cæsarea Philippi); while Archelaus, as the principal heir, obtained Samaria, Judæa, and Idumæa. Because of the severe vengeance wreaked upon his subjects who had opposed his claims before the emperor, Archelaus was dethroned and exiled in 6 A.D., his lands being attached to the province of Syria. Thenceforward, except under Herod Agrippa I. (41-44 A.D.), who secured the territories of Philip and Antipas, and whose dominions were thus co-extensive with those of his grandfather, Judæa was governed by Roman procurators. Under the first of these, Cuspius Fadus (from 44), occurred the rebellion of Theudas. The others were Tiberius Alexander (till 48), Cumanus (48-52), Felix (52-60), Festus (60-62), Albinus (62-64), and Gessius Florus (64-66). Under the two last-named there was no security for life or property; they shared, in fact, the spoils of the Assassins or Ismailites (Sicarii). The Jews had long chafed under the insolence of Roman rule, and during the procuratorship of Florus they rose in revolt and appointed rulers of their own. At the date of Nero's death (68) the Roman general Vespasian had subdued practically the whole of Palestine except Jerusalem. For nearly two years the capital had a virtual respite from external attack, but was torn by internal strife. Meanwhile Vespasian had become emperor, and he commissioned his son Titus to reduce Jerusalem. Owing to the desperate resistance offered by the Jews, both temple and city were destroyed (70 A.D.); and three years later, on the fall of the fortress

of Masada, the rebellion was completely quelled.

Literature.—General: Dunker's *Geschichte des Alterthums* (5th ed. 1878-86); Schrader's *Cuneiform Inscriptions and the Old Testament* (1885-8); M'Curdy's *History, Prophecy, and the Monuments* (1894-1901); W. St. C. Boscawen's *The Bible and the Monuments* (1895); G. A. Smith's *Historical Geography of the Holy Land* (1898); Sayce's *Early Israel and the Surrounding Nations* (1899); W. Robertson Smith's *The Religion of the Semites* (3rd ed. 1901). Special: Prideaux's *The Old and New Testaments connected in the History of the Jews*, etc. (1716-18; new ed. 1858); Milman's *History of the Jews* (1829-30; new ed. 1892); Ewald's *History of Israel* (Eng. trans. 1867-86); Stanley's *Jewish Church* (1863-76); Reuss's *Histoire des Israélites* (1877); Stade's *Geschichte des Volkes Israel* (1887-98); Renan's *Histoire du Peuple d'Israel* (1887-98); Kittel's *History of the Hebrews* (Eng. trans. 1895-6); Klostermann's *Geschichte des Volkes Israel bis zur Restauration unter Ezra und Nehemiah* (1896); Kent's *A History of the Hebrew People* (1896-7); Wellhausen's *Israelitische und Jüdische Geschichte* (4th ed. 1901), and article 'Israel' in 9th ed. of *Ency. Brit.*; Cornill's *Geschichte des Volkes Israel* (1898); Piepenbring's *Histoire d'Israel* (1898); Guthe's *Geschichte des Volkes Israel* (1899), and article 'Israel' in *Ency. Bib.*; Riggs's *A History of the Jewish People* (1900). The following are of Jewish authorship: Jost's *Geschichte der Israeliten seit den Makkabäern* (1820-47); Herzfeld's *Geschichte des Volkes Israel* (1847-57); Graetz's *Geschichte der Juden von den ältesten Zeiten bis auf die Gegenwart* (1853-77; English abridged ed. 1891-2); Derenbourg's *Essai sur l'Histoire et la Géographie de la Palestine* (1867). On particular points and epochs: Strachey's *Jewish History and Politics in the Times of Sargon and Sennacherib* (2nd ed. 1874); Bateson Wright's *Was Israel ever in Egypt?* (1895); W. Robertson Smith's *The Prophets of Israel and their Place in History* (2nd ed. 1895); Schürer's *A History of the Jewish People in the Times of Jesus Christ* (1886-90); Hunter's *After the Exile* (1890); Moss's *From Malachi to Matthew* (1893); E. Meyer's *Die Entstehung des Judenthums* (1896); A. B. Davidson's *The Exile and the Restoration* (1897); Streane's *The Age of the Maccabees* (1898); Fairweather's *From the Exile to the Advent* (2nd ed. 1901). On the inner history of Israel: Spencer's *De Legibus Hebræorum Ritualibus* (1727); Jost's *Geschichte des Judenthums und seiner Sekten*

(1857-9); Kurtz's *History of the Old Covenant* (Eng. trans. 1859); Geiger's *Judaism and its History* (1866); Wellhausen's *Die Pharisäer und Sadducäer* (1874); Kuenen's *Religion of Israel to the Fall of the Jewish State* (1874-5); Duff's *Old Testament Theology* (1891); J. Robertson's *Early Religion of Israel* (2nd ed. 1892); Schultz's *Old Testament Theology* (1892); Smend's *Alt-Testamentliche Religionsgeschichte* (1893); Dillmann's *Handbuch der Alt-Testamentliche Theologie* (1895); Cheyne's *Jewish Religious Life after the Exile* (1898); Budde's *The Religion of Israel to the Exile* (1899); Kautzsch's article 'Religion of Israel' in *Hastings's Dict. of the Bible* (1904); Otley's *The Religion of Israel* (1905).

Israëls, JOZEF (1824), Dutch painter, born at Groningen, of Jewish parentage. Inspired by the Romantic movement in France, his two modern, individual pictures, *Children by the Sea* and *Evening on Shore*, attracted much attention at the Paris Salon of 1857. His mature powers awoke after his return to Holland, where he became the painter-interpreter of the people, fishermen and peasants. Israëls is called the embodied strength of modern Holland by reason of his intense nationalism, his individuality, his independence, his deep human emotion, and brooding poetry of sentiment, in addition to his mastery of technique and colour. His more noteworthy pictures embrace *Interior of the Orphan Asylum at Katwijk* (1867); *The Faithful Comrades* (1870); *The Village Poor* (1878); *The Struggle for Life* (1883). See Jozef Israëls, by Netscher (1887); and J. Israëls, by Liebermann (1901).

Israfil, or ISRAFEEL, the angel of melody in Paradise, whose voice is more melodious than that of any of God's creatures. In the Mohammedan system it is said that he will sound the resurrection trumpet.

Issik-kul, or ISSYK-KUL, lake of Asiatic Russia, prov. of Semirechensk, between the Kungheï Ala-tau (N.) and the Terskeï Ala-tau and main Tian-Shan (S.). Its length is about 125 m., its greatest breadth is 35 m., its basin is over 2,000 sq. m. in area. It is estimated that its banks were once 200 ft. higher than at present. It abounds in fish, and its natural wealth is beginning to be exploited by the Russians.

Issoire, tn., dep. Puy-de-Dôme, France, 19 m. S.E. of Clermont-Ferrand; has manufactures of machinery. It was almost destroyed in 1577 during the religious wars. Pop. (1901) 5,791.

Issoudun, tn., dep. Indre, France, 22 m. W.S.W. of Bourges; has manufactures of parchment,



A Picture by Jozef Israëls—'The Frugal Meal.' In the Glasgow Gallery.
(Photo by Hansfaenger.)

woollen and linen cloths, and agricultural implements, and is famed for lithographic stones. It has a 13th-century castle. Pop. (1901) 14,222.

Issue. (1.) The issue of a person are, properly speaking, his descendants, but the term is often wrongly used in the sense of 'children.' By the Wills Act, 1837, the words 'die without issue' mean in wills 'without issue living at a person's death.' (2.) The parties to an action are said to 'join issue' when they have arrived in the pleadings at a substantial disagreement as to law or fact. (3.) In Scotland, 'issues' in a jury trial are a concise statement of the questions to be answered by the verdict. These are, of course, issues of fact, an issue of law being for the decision of the judge.

Issus, an ancient city in S.E. Cilicia, at the head of the Gulf of Alexandretta, and at the N. end of the pass through Mount Amanus known as the Syrian gates. It is famous for Alexander's defeat of Darius Codomanus, gained in a neighbouring valley in November 333 B.C.

Issy, tn., dep. Seine, France, on l. bk. of the Seine, close to Paris; has distilleries, brass and chemical works. Pop. (1901) 16,639.

Istakhr. See PERSEPOLIS.

Istambol. See CONSTANTINOPLE.

Isthmia, the Isthmian festival, one of the great athletic contests of ancient Greece, was held, in honour of Poseidon, near the isthmus of Corinth, and was managed by the Corinthians; though, as Theseus the Athenian was regarded as the founder of the festival, special places were reserved for a number of Athenians. Its historical importance, if not its actual existence, began about 580 B.C. The same contests were held as at Olympia. The festival was held in the first and third years of each Olympiad. The prize of a victor was at first a wreath of pine leaves, afterwards one of ivy. See Krause's *Die Pythien, Nemeen, und Isthmien* (1841).

Istria, prov. of Austria, forming a peninsula at the head of the Adriatic Sea. It has rocky coasts, with the Gulf of Trieste on the N. and the Gulf of Fiume on the S. The inhabitants, nearly two-thirds Slavs and the rest Italians, are engaged in fishing and seafaring pursuits, in growing olive oil, wine, and fruits, in breeding live stock, in evaporating salt, and in mining. Its area, which embraces also the islands of Veglia, Cherso, and Lussin, is 1,912 sq. m. Istria formed from the 10th century onwards a separate countship. Pop. (1900) 344,173.

Isturiz, FRANCISCO XAVIER DE (1790-1871), Spanish statesman, born at Cadiz. Through the part he took in the revolution of 1820 he was forced to flee to England, where he remained till the general amnesty of 1834. After his return to Spain he became premier and minister of foreign affairs (1836), and president of the Cortes (1838). He was premier again in 1846, and Spanish ambassador at the Court of St. James (1850-54), at St. Petersburg (1856), and at Paris (1863-4).

Iswar Chandra (1820-91), Bengalese writer and social reformer, born at Birsinha in Bengal, of Brahman descent. In 1847 he published in Bengali the *Twenty-five Tales of a Betal*, followed by *Sakuntala* (1855) and *The Exile of Sita* (1862). Appointed principal of the Sanskrit College, Calcutta, he devoted himself to educational and social reforms, including the remarriage of Hindu widows (1856). He laboured incessantly to better the lot of Bengalese women, and was renowned for his charities.

Itacoatiara, tn., opposite the mouth of the Madeira, trib. of the Amazons, Brazil; exports cocoa, dried fish, india-rubber, etc.

Itacolumite, or FLEXIBLE SANDSTONE, is a porous, yellow sandstone found in Brazil, which when cut into thin slabs is slightly flexible. If a bar of it be suspended by two strings at its ends, it will slowly bend into a curved form, and when removed from the supports will, after a time, again straighten. This is supposed to be due to the sand grains which form the rock not being firmly cemented together. Beds of flexible sandstone are also found associated with the magnesian limestone of Durham in England. The Brazilian itacolumites occasionally contain crystals of diamond.

Itagaki, COUNT TAISŪKE (1838), Japanese statesman, took an active part in the civil war against the Shogunate (1868), and after the restoration became an ardent advocate of representative government. He has held several great offices of state, and in 1898 he with Count Okuma formed the first cabinet of the Constitutional party.

Itajahy, port at mouth of riv. Itajahy, prov. Sta. Catharina, Brazil, 60 m. N. of Florianopolis.

Italian Architecture. See ARCHITECTURE.

Italian General Navigation Company is practically the only Italian steamship line of importance. It has its headquarters at Rome, and is an amalgamation, formed in 1901, of various steamship services—the Florio steamship lines of Palermo, Rubattino of Genoa, and La Veloce Naviga-

tion Italiana. The company's service includes lines to India, China, and New York, and to the Mediterranean and River Plate ports. The fleet numbers 104 vessels, aggregating 224,338 tons.

Italian Greyhound, a miniature replica of the ordinary greyhound. It is a nervous and delicate animal, and has long been a favourite with ladies. In Italy it was known in the 15th century. The weight varies from four to nine pounds, and the colour appears to have changed from time to time with the fashion. At one time cream-coloured dogs were in vogue; at another, white dogs with black noses. Blue and fawn are now probably the most popular; the latter should be of a golden hue, with the toe nails black. Points: the same as in the greyhound, but body somewhat fuller in proportion, and the nose shorter. Coat should be fine, soft, and glossy. Mixtures in colours are undesirable.



Italian Greyhound.

Italics, letters of Italian origin, as the name implies. They are more cursive than the ordinary printed minuscule, and imitate a business hand rather than a book hand. (See MINUSCULES.) Although the letters are not joined to one another in modern printing, the ligatures or connecting lines at the beginning and end of each letter are a prominent feature. The first types of this character were those used in the Aldine press at Venice in the 16th century. This press employed square Roman letters for the capitals, and certain of the letters are actually joined to one another. Italic type is now employed to distinguish words, phrases, or sentences which contrast in some way with their context. Words from a foreign language are usually printed in italics; also emphatic words which need the help of type to show their emphasis. The type is appropriate for letters because of its resemblance to writing, and in older books speeches, etc., are sometimes printed in it.

Italicus, SILIUS. See SILIUS ITALICUS.

Italy embraces the peninsula which extends southwards from the Alps, with Sicily and Sardinia, and various smaller islands—*e.g.* Elba, Ischia, Capri. The entire area amounts to 110,623 sq. m., of which 91,393 sq. m. belongs to Italy proper, 9,936 to Sicily, and 9,294 to Sardinia. The geography of Italy may be conveniently studied in five sections: (1) the Alps; (2) the basin of the Po; (3) the peninsula proper; (4) Sicily; (5) Sardinia. The last two are treated of in special articles.

The Alps extend along the whole

(1,340 ft.), Iseo (985 ft.), and Garda (1,135 ft.). These sheets of water are famous for their lovely natural scenery.

The basin of the Po stretches from the Alps in the N. to the Apennines in the S., and embraces an area of 37,000 sq. m. From this basin the Alps rise steeply on both N. and W., but the ascent to the Apennines, although shorter, is much gentler. The Po is the main drainage artery of this region, though it is assisted in that function by the Adige (Etsch), Brenta, and Piave. Owing to the

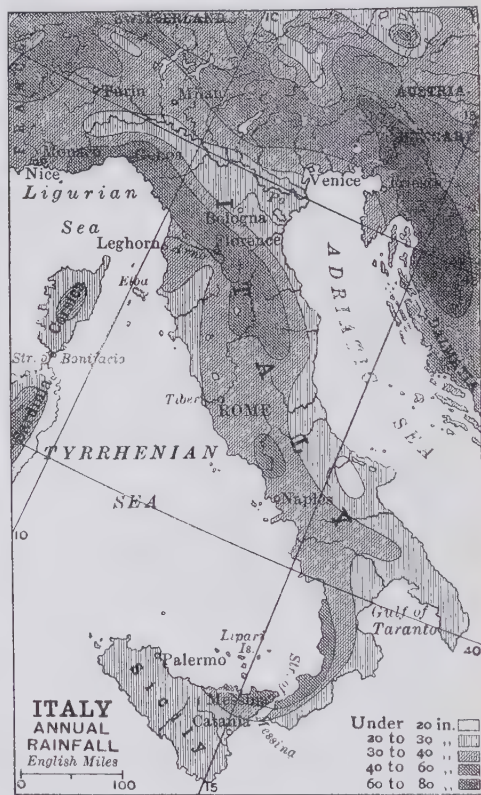
are large lagoons—*e.g.* Venice and the Valli di Comacchio, the last of which yields an abundance of salt and eels.

The governing feature of the long peninsula, which stretches for 750 miles to the S.S.E., is the range of the Apennines. These, or their successive sections, break Italy up into several geographical or political divisions. South of the northern section—*i.e.* between the Ligurian Alps and the sea—is the narrow strip of the Riviera, with its picturesque scenery, genial climate, subtropical vegetation,



of the N. of Italy, and shut it off from Savoy on the W. and Switzerland and Austria on the N. and N.E. The highest summits lie, however, outside of Italian territory. The dividing line between the Alps and the Apennines is generally taken to be the pass (1,600 ft.) which connects Turin with Savona. Almost all the Alpine valleys of Italy terminate in end moraines, often 1,000 ft. high, some of them 2,000 ft. Several of them also contain deep lakes, all long and narrow—*e.g.* Lago Maggiore (1,230 ft. deep), Orta, Lugano (945 ft.), Como

steep descent of its head-feeders, and the destruction of the forests on the surrounding mountains, the river brings down enormous quantities of sedimentary matter; it has been calculated that its entire basin is lowered one inch in every sixty years, and that its delta encroaches upon the Adriatic at the rate of a square mile in every three and a half years. Both the Po and the Adige are embanked for great distances, the banks of the former being in some cases of great antiquity. Along the Adriatic coast, both N. and S. of the Po delta, there



and string of maritime winter resorts (Bordighera, San Remo, Porto Maurizio, Nervi, Santa Margherita, etc.). There, too, are the seaport of Genoa and the chief naval port of Spezia. A little to the S.E. of the last named is the gloomy limestone range of the Apuan Alps (6,000 ft.), which yield the valuable white Carrara marble. Beyond them lie the Tuscan highlands, backed on the N., or rather the N.E., by the Etruscan Apennines, which are crossed by a magnificent railway from Pistoia to Bologna. This district is drained

by the Arno, the river of Florence. Its w. seaboard is the malaria-stricken lowlands (stretching south of Leghorn) known as the Maremma. Next comes the basin of the Tiber, flanked on the E. by the Roman Apennines. These split into two chains—an eastern, which culminates in the mountain-knot of the Gran Sasso d'Italia (9,580 ft.); and a western, which reaches its highest elevation in Monte Velino (8,155 ft.). This is the rugged and formerly lawless region of the Abruzzi.

vated, as is also Trasimeno in part. The Neapolitan Apennines, which separate the Neapolitan territories from the low plains of Apulia on the E. side of the peninsula, also send out a spur which parts the Gulf of Salerno from the still lovelier Bay of Naples. The Apennine range continues southwards to the extremity of the Calabrian peninsula, where, however, the height increases, first in the densely-wooded mountain knot of La Sila (5,500 ft.), and subse-

with others at Messina, Catania, Syracuse, Porto Empedocle (for Girgenti), Marsala, and Trapani; while Sardinia is chiefly served by Cagliari, with Oristano and Porto Torres.

Owing to the sheltering range of the Alps and her semi-insular position, Italy enjoys a relatively warm climate, the summer mean falling between 70° and 80°, and the winter mean between 35° and 50°. The greatest extremes occur, of course, in the more continental region of the Po basin. The sum-



From Monte Amiata (5,690 ft.), on the southern border of Tuscany, a volcanic belt, containing the crater lakes of Bolsena, Vico, Bracciano, Nemi, and Albano, extends through ancient Etruria, southwards as far as the great active volcano of Vesuvius (4,200 ft.). Along this stretch of 200 miles there are the plains of the classic Campagna with its ancient ruins, the malarial Pontine Marshes, and the exceptionally fertile and densely-peopled Campania, immediately N. of Naples. The ancient lake of Fucino, lying nearer the heart of the Apennines, is now drained and culti-

quently in the protuberance of Aspromonte (6,400 ft.).

Although the coast-line runs to over 2,000 miles, Italy possesses only three harbours on the Adriatic—Venice, Ancona, and Brindisi; but at the head of the Gulf of Taranto, which divides the two peninsulas of Apulia and Calabria, she has the excellent harbour of Taranto, and on her w. coast, besides a great number of small ports, the larger harbours of Naples, Civita Vecchia (the port of Rome), Leghorn, Spezia, Genoa, and Porto Maurizio. Further, Sicily possesses the splendid harbour of Palermo,

mers are, as a rule, in great part rainless. The scorching, dry, withering wind known as the *sirocco* may sweep at all seasons, though it generally comes in the spring, across Sicily and the southern part of the peninsula; but all Italy is visited by soft moist south winds, which likewise bear the name of *sirocco*. Various low-lying coastal tracts—e.g. the Maremma, Agro Romano, Pontine Marshes, the shores of the Gulf of Taranto, the lagoons of Venice, the s. coast of Sicily, and the s. and w. shores of Sardinia—suffer severely from malaria in summer, although since

1882 determined efforts have been made to mitigate the evil. (See AGRO ROMANO.) Only six out of the sixty-nine provinces of the kingdom are pronounced free from the scourge, which is serious in no less than fifty. This evil is to a great extent a modern feature, and has been caused, *inter alia*, by the destruction of the forests, and the resultant formation of stagnant marshes.

Sulphur, obtained chiefly in Sicily, is the chief mineral of Italy, one-half of the total annual value of the mining produce (some £4,000,000) being due to it. Zinc and lead are mined in Sar-

wheat, together with fruits (figs, oranges, lemons, almonds, and chestnuts). In addition, on the pastures of N. Italy large quantities of cheese (Gorgonzola, Parmesan, Stracchino) are made. Beetroot is grown for sugar. Tobacco, hemp, and flax are also extensively cultivated, the first named being a government monopoly. The prevalent systems of cultivation are mostly antiquated, the peasants tilling the ground for the owners under various agreements of the *métayer* type, though leases are also granted. The breeding of silkworms gives occupation to a great number of

spirits, pottery and porcelain, glass (Venice), chemicals, and furniture. Milan is the busiest industrial centre in the country.

During the same period the commercial expansion of Italy has kept even pace with her manufacturing development. Whereas in 1875 the total value of the entire foreign commerce amounted to £82,000,000, in 1903 it reached a total of £135,176,000, or an increase of 65 per cent, since 1875. The exports (silk, cereals, cheese, etc., wine, olive oil) go principally to Germany, Switzerland, France, United Kingdom, the United States, and Austria-Hungary; the imports (cereals, coal and minerals, silk, cotton) come principally from the United Kingdom, the United States, Germany, France, Austria-Hungary, and Russia. The mercantile marine of Italy is, however, small, the total tonnage being under a million tons.

Railways run the entire length of Italy on both sides of the peninsula, and nearly a dozen lines run across the Apennines to connect these two great trunk lines. Most of the lines belong to the state, but by a law of 1885 are leased to three large companies. Between 1881 and 1904 the total length of the railways nearly doubled—i.e. it increased from 5,520 m. to 9,960 m.

In 1871, the first census taken after the unification of the kingdom, the population amounted to 26,801,154; in 1901 it numbered 32,475,293, or an increase, in spite of an annual emigration of latterly 100,000 to 200,000 persons, of 5,674,139. The race is a homogeneous one, and belongs almost entirely to the Roman Catholic Church. Elementary education is still backward in many of the remoter parts and in the s., especially in Calabria and Sicily. There are twenty-one universities, of which those of Naples, Turin, Rome, Bologna, Padua, Genoa, Pavia, Pisa, and Palermo are the most frequented. Higher commercial schools exist at Venice, Genoa, and Bari; technical and commercial schools for women at Florence and Milan.

Italy is a constitutional monarchy, the king being assisted by a senate nominated by himself, and by a house of 508 popularly elected representatives. The political capital is Rome. Italy possesses a permanent army of about 757,000 (including reserves), a mobile militia of 308,000, and a territorial militia of 2,222,000 men, and has a relatively powerful fleet. From deficits of £3,000,000 and more in the 'sixties, and of £1,000,000 and over in the 'eighties, the state finances gradually improved, until in 1900-3 they pro-



dinia; iron in Elba, and in some of the Alpine valleys; statuary marble at Carrara and Massa; while boracic acid is obtained in Tuscany, and salt is evaporated in Sardinia, Sicily, and various spots on the coast of Italy proper. The predominating industry of the country is, however, agriculture, although the industry groans under the burden of a heavy taxation. Maize is the principal crop of the N., though the production of rice is of great economic value. The chief crops of the s. and of the islands, all of which are more backward than the N., are the olive (and olive oil), vine, and

people in N. Italy, the manufacture of silk being an industry of the greatest importance at Como, Milan, Bergamo, Venice, and N. Italy generally. This industry, like the manufacturing industries as a whole, has made remarkable advances since 1880. Other important branches are the manufacture of cottons, chiefly in N. Italy, Tuscany, and Campania; of woollens, more generally distributed; ironshipbuilding and engineering and mechanical workshops at Terni, Savona, Sampierdarena, Naples, Pozzuoli, etc.; the manufacture of paper, olive oil, wine, sugar, tobacco, salt,

duced an average annual balance of £1,045,850 to the good. Nevertheless there is a heavy load of national debt to carry—namely, £504,856,500 in 1901, or £15, 4s. per head of the population. Italy's foreign possessions are Eritrea, with 670 m. of coast on the Red Sea, and Italian Somaliland.

See Nissen's *Italische Landeskunde* (1883-1902) and Deecke's *Das Königreich Italien* (1898), both very useful; also F. V. V. Rolf's *Cons. Reports* (British) on Naples and the S.; Bolton King and T. Okey's *Italy To-day* (1901); Dr. W. N. Beaulier's *Rural Italy* (1888); M. Carmichael's *In Tuscany* (1901); and P. D. Fischer's *Italien und die Italiener* (2nd ed. 1901).

History.—The name Italy was originally applied only to the southern extremity of the peninsula. During the age of the republic it was extended to the central provinces, the territory north of the Apennines being known as Cisalpine Gaul. It was in the imperial period that the name first came to include the whole peninsula. It is difficult to fix an exact date for the end of Roman and the beginning of Italian history. Barbarian invaders first penetrated into the country early in the 5th century, but it was long before they founded a settled government, and titular 'emperors of the West' still resided in Italy. In 476, however, Odovakar (Odoacer), a Herulian chieftain, deposed the last of these emperors, and was proclaimed king of Italy by his followers, though he acknowledged the superior authority of the Eastern emperors. Yet both under Odovakar, and under his conqueror and successor Theodoric, king of the Ostrogoths (493), the Roman character of the administration was little changed. Theodoric was much under the influence of Cassiodorus, an able Italian statesman, who probably determined the form of the government. The conquerors appropriated one-third of the land; but where so much was unoccupied, this implied no great revolution. Roman laws, language, offices, and institutions were preserved; social customs, and such as there was of art and literature, remained Roman. Theodoric also professed allegiance to the Eastern empire, and was always trying to get from the emperor formal recognition of his position as king of Italy. Though himself an Arian, Theodoric was tolerant of Roman Catholicism; but the orthodox population, after his death (526), gladly welcomed the restoration of the authority of the Eastern emperor, Justinian.

Two famous Greek generals, Belisarius and Narses, reconquered Italy, the latter defeating and killing the Goth chief Totila (552). The country was now governed by a Greek official, called an 'exarch,' who resided at Ravenna; and Justinian's own code of law was introduced. But only a few years later appeared a fresh swarm of invaders, the Lombards. They never succeeded in conquering the whole country; the exarchate of Ravenna and the Pentapolis, on the east coast, remained subject to the empire, as also did the south, though there were Lombard dukes of Benevento and Salerno. Venice, though practically independent, and Rome, dominated by its bishops, also acknowledged the authority of the Greek emperors. Yet the Lombard dominion was much more firmly founded than those of its barbarian predecessors, and its effects upon the character and history of the country were far-reaching and permanent. The Lombards adopted the language, customs, and civilization of their subjects, and were converted from Arianism to Roman Catholicism. To a great extent Roman law and institutions survived, though modified by Lombard customary law. Government was at first decentralized, in the hands of a number of almost independent dukes; but King Liudprand (712-744) succeeded in imposing the royal authority on them. The absence from Italy of any stable authority left room for an immense development in the power of the bishops of Rome, especially in their own city and the surrounding country. Though they still considered themselves subjects of the Eastern empire, they tried to assert their supremacy over the Eastern Church, and finally quarrelled openly with the emperor, Leo the Isaurian, on the question of image-worship. Liudprand espoused the pope's cause, attacked the Greek dominions, and seemed to be on the point of completing the conquest of Italy. But then the popes took fright, and turned for help to the Franks, who had established a strong power in Gaul. Pope Stephen II. called Pepin, king of the Franks, into Italy (754). Pepin defeated the Lombards, and bestowed the exarchate and Pentapolis on the papacy, which thus founded its territorial power on the ruin of the Greek. Charlemagne, son of Pepin, called into Italy by Pope Adrian (773), confirmed the grant, conquered the Lombards, and was himself proclaimed king. Finally he was crowned emperor at Rome by Pope Leo III. (800); and thus the authority of the Eastern emperors was wholly shaken off, and a

new empire set up to embrace all Western Europe.

This left Rome merely the nominal capital of a large empire, of which Italy was an outlying province. Her alien monarchs had little effective power, even when they were themselves in the country. Though feudalism was not so powerful as in other countries, the emperors had to contend with the Lombard dukes of Benevento and Spoleto; the Greeks, who still held the south; and the Saracens, who in the 9th century conquered Sicily and tried to conquer Italy. After the Carolingian monarchy broke up, and rival claimants struggled for both Italy and the imperial title, there was complete anarchy in Italy until the establishment of the Saxon dynasty of emperors. Then Otto I. (emperor, 962) and Otto III. enforced a temporary submission upon all the country except the extreme south, and tried to reform the papacy, which had fallen under the control of the Roman aristocratic families, and was sunk in the lowest depths of vice and degradation. But directly their personal influence was removed, Italy relapsed into anarchy. The margraves of Tuscany and of the Piedmontese 'march' were almost independent; while in the south appeared a new disturbing element in the Norman adventurers, who in the 11th century, led by Robert Guiscard and his brother Roger, conquered S. Italy from the Greeks and Sicily from the Saracens.

But in the latter half of the 11th century the church itself initiated that reformation which the emperors could not effect. The Hildebrandine reform, as it was called from the great churchman who was its moving spirit, must be studied as part of papal and imperial history; but as regards purely Italian affairs, its effects were momentous. In the war of investitures both parties strove to gain allies in Italy. The emperor was supported by most of the feudal nobles, especially the Roman aristocracy, who resented the independence of the reforming popes. The papacy found on its side the powerful Countess Matilda of Tuscany, who left her vast possessions to the papacy by will (1115)—a bequest which formed a new subject of strife, since, as the emperors rightly contended, imperial fiefs could not be disposed of in this manner. Besides Matilda, the Normans of S. Italy were allies of the papacy. To strengthen their hold on their new dominions, they consented to receive papal investiture for them, doing homage and paying a tribute; so that here, as in the Pentapolis, the papacy succeeded in constituting

itself heir to the Greek empire. But when, on the accession (1152) of Frederick I. of Hohenstaufen (Barbarossa) to the empire, the papal-imperial quarrel broke out afresh, the strongest ally of the papacy was a new Italian force,

termining; but certain resemblances in their economic life seem at least to indicate a connection between the mediæval 'guild' and the Roman 'collegium,' and Lombard influence was less felt in the towns than in the country. In the

replace that of the bishops, and then by degrees the towns took over the administration of the surrounding country districts which the bishops had ruled as counts. There was great variety both in the time and in the character of



that of the communes, which during the last century had gradually been coming into prominence.

How much the towns preserved of their municipal organization from Roman times we cannot de-

termine; but certain resemblances in their economic life seem at least to indicate a connection between the mediæval 'guild' and the Roman 'collegium,' and Lombard influence was less felt in the towns than in the country. In the

development of the different towns. The most advanced were the great trading cities of the coast, Venice, Genoa, and Pisa, which had wide commercial relations, especially in the East. At Rome, too, there was in the 11th

century a curious but brief attempt to set up a republic, under the influence of a classical enthusiast, Arnold of Brescia. But by the end of the century the chief towns of Lombardy were sufficiently advanced to form a league of their own and assist the papacy against the empire. They felt the control of imperial officials a check on their progress towards autonomy, and the feudal nobles, their natural enemies, formed the bulk of the imperial party. When the names of the rival German dynasties, Welf and Waiblingen, were transported to Italy as Guelf and Ghibelline, it was the Lombard league and the papacy which formed the original Guelf party.

Thus, when Frederick I. reasserted imperial rights in Italy, especially the power to appoint officials and to collect taxes, and claimed Matilda's inheritance, he came into opposition with both the popes and the towns. From 1159-77 the struggle raged fiercely, with varying fortune. Frederick had at first the help of some of the towns, jealous of the predominance of Milan. Milan was taken after a long siege, and razed to the ground (1162). Afterwards nearly all the towns were ranged against the emperor. They built a new city, and called it Alessandria, after their ally the pope; they beat Frederick at the battle of Legnano (1176); and, by the treaty of Constance (1183), extorted practical recognition of their autonomy.

Besides their claims to central Italy, there was a new subject of contention between the popes and Frederick's son, Henry VI., on account of the marriage of the latter with Constance, heiress of the Norman dynasty of Sicily, and his claim to its inheritance (1189). For S. Italy to become the direct property of the emperors would be a great danger to the papacy, and the emperors naturally objected to paying homage for it to the popes. Henry VI. was powerful enough to disregard the papacy; but the struggle was carried on with renewed vigour between the popes and his son, Frederick II. (1220). The communes again joined the papacy; for Frederick reasserted imperial rights over them, and appointed vicars from among the Ghibelline nobility. Nor was he always very careful in his choice, as in the case of the notorious Ezzelino da Romano, at whom even that ferocious age shuddered as at a monster of cruelty. It was the great combat of civic independence and industrial progress pitted against the forces of feudalism. Frederick II. died, defeated and disheartened (1250);

his heirs fell victims to the relentless enmity of the papacy. Once again in the history of Italy the popes turned to France for aid against a German foe. Charles, count of Anjou, brother of Louis XI., was invited to undertake a crusade against Frederick's illegitimate son, Manfred, king of Naples and Sicily. S. Italy fell under the rule of the new dynasty, in whose hands the advanced stage of administration and civilization which had accompanied Hohenstaufen rule disappeared before a revival of feudalism, which was to characterize the country for centuries. But Sicily soon (1282) broke away from the French yoke, and established a dynasty of Aragonese princes, thus for a considerable period cutting itself off from the history of Italy.

Meanwhile the fall of the Hohenstaufens, the long interregnum, and the weakness of the later empire left N. Italy free to develop along its own lines. The Tuscan communes had followed those of Lombardy, and gained their emancipation. Mutual jealousies and struggles for territorial expansion and commercial predominance tore the town league asunder as soon as foreign pressure was removed. Between town and town, within each town also, the fiercest party strife broke out; the parties labelled themselves 'Guelfs' and 'Ghibellines.' Yet it was not for any principle that they fought, but solely because of their intestinal quarrels and the ambitions of the leading burgher families. Half the citizens were disfranchised, or else in exile, allied with a neighbouring town or noble, only waiting for the first chance to return and oust their rivals. To increase the confusion, the turbulent feudal nobility, whom the burghers had dragged into the towns in order to keep them under control, transferred their private feuds thither, and strove for a share in the government.

To restore peace, the communes resorted to the expedient of replacing the consuls by a single powerful magistrate, called a *podestà*, who was brought from a distance in order that he might have no interest in the town parties. Rather later the struggle evolved itself mainly into one between classes—the *grandi* (aristocracy, whether of feudal or city origin) and the *popolani* (the trading class). The latter gained in strength, and formed an organization, based upon their guilds, called the *popolo*, which was distinct from the commune, a kind of municipality within the municipality. Its chief official was the *podestà*, or captain of the *popolo*. In order to deal

with internal anarchy, the powers of one of these officials were greatly extended—they were often chosen from among the rural noble families—and the result was that, by the end of the 13th century, the towns, exhausted by their own internal contests, were rapidly relinquishing their independence to local *signori*, or tyrants. Such were the Estes of Ferrara, the Visconti of Milan, the Carraras of Padua, the Della Scalas of Verona, the Gonzagas of Mantua. All of them strove to obtain the lordship of as many towns as they could, and thus N. Italy was divided into small states, composed of groups of towns under signors. They struggled together for predominance, each trying to seize his neighbour's territory. The most successful were the Della Scalas and the Visconti, who in turn extended their conquests into Central Italy, and seemed to be on the point of establishing an Italian kingdom. Both were Ghibelline, and were opposed by a Guelf league, of which Florence was the moving spirit. The Della Scalas were not without princely characteristics; the Visconti, rising on their fall, were more subtle and unscrupulous. Gian Galeazzo, the cleverest of the race, was master of a third part of Italy before sudden death cut short his career (1402).

In Tuscany, ruled till the end of the 11th century by a powerful margrave instead of by bishops, there was a sharp struggle between Guelf and Ghibelline towns, but the Angevin conquest of Naples gave the advantage to the Guelfs. Florence, head of the Guelf league, gained a hegemony in Tuscany, which in the 14th century she gradually converted into a dominion over subject towns; so that in Tuscany the principal *signor* was a city and not a prince. After her conquest of Pisa (1406), Florence ruled over all Tuscany except Siena and Lucca.

She had difficulties to overcome both within and without. Many of the towns themselves resisted vigorously; and she had hard struggles with Castruccio Castracani, lord of Lucca and Pisa, and with the Della Scalas and the Visconti. She might have been in much danger from her allies, the Angevins, who wanted to add Tuscany to their dominions, had not the popes interfered to prevent their growing too powerful. The 14th-century emperors, on their brief visits to Italy, attacked her as the bulwark of Guelfism. Henry VII. (1310) roused a strong but brief recrudescence of imperialism, such as Dante embodied in his *De Monarchia*.

Louis of Bavaria (1327), though otherwise insignificant, was the ally of Castracani. Within, Florence was torn by party strife—Grandi and Popolani, Guelphs and Ghibellines, Blacks and Whites, Greater 'Arts' (Guilds) and Lesser. Once (1342) she nearly fell under the yoke of a despicable adventurer, Walter of Athens; she was shaken by a great rising of labour against capital—the Ciompi revolt (1378). Finally her government was restricted to a close oligarchy of wealthy burghers.

The great seaports, after an early development and great commercial expansion, unfortunately diverted their energies to mutual destruction. Genoa, after a contest for Corsica, finally crushed Pisa at the battle of Meloria (1284); and then, in a struggle with Venice for the control of Eastern trade, she was in turn ruined by the Chioggia war (1378). Pisa became subject to Florence; Genoa was sometimes ruled by turbulent factions, sometimes by Milan, sometimes by France. Venice alone continued to prosper, and consolidated her government into a narrow, powerful oligarchy.

The popes also took advantage of the weakness of the empire, and consolidated the papal states; the Emperor Rudolf of Hapsburg, in return for papal help in his election, acknowledged their sovereignty over Romagna, Umbria, and the March, as well as in the original patrimony (1278). But when the popes fell under the influence of France, and moved their residence to Avignon (1309), their states fell into anarchy; and their legates, sent from time to time, were unable to restore permanent order amongst the communes, petty tyrants, and great feudal families. Rome, always restless, set up a quasi-classical revival of republican government under the leadership of Rienzi (1347-54); but he soon fell a victim to his own extravagances. The pope returned in 1378; but immediately afterwards the great schism began, and the anarchy continued unabated.

By the 15th century, however, we find Italy settling into a more tranquil condition, the minute factions into which she was split up tending to consolidate into five larger states. The different rulers, having secured their position, became more humane and enlightened, with only occasional outbursts of that wild ferocity which had marked their earlier struggles for power. Their subjects enjoyed a great measure of prosperity, and their wars were waged almost entirely by mercenary soldiers—a plan which entailed much suffering on the

country districts, but gave great ease to the unwarlike burghers. There was immense commercial activity, and the 15th century saw the rise of that great intellectual and artistic movement which is called the renaissance. Life in court and city was brilliant and varied; and though political liberty had nearly disappeared, it had never really been enjoyed except by a limited class of burghers, while the position of the masses was as favourable under a humane 'tyrant' as under the struggling factions of the oligarchies. This may specially be noted in the case of Florence, where, in the 15th century, a reaction against the oligarchy gave opportunity to the wealthy, clever banker Cosimo de' Medici, who manipulated half the finance of Europe, to acquire an influence in the government, which his grandson, Lorenzo, turned into an almost absolute control. If they demoralized Florence by luxury, the Medici gave her peace and prosperity, and by their encouragement of culture kept her in the forefront of the renaissance.

The 15th century consists mainly in the development and mutual relations of the five greater states. The first important change was the rapid formation of a mainland state by Venice, impelled in this direction by the advance of the Turks in the east. The first half of the century was filled with long wars between her and Filippo Maria Visconti, a great part of whose father's states she had absorbed. The wars were fought by *condottieri* (mercenary soldiers), and the chief of them, Francesco Sforza (d. 1464), succeeded his father-in-law, Visconti, as duke of Milan. Venice governed her dominions well, but she inspired her neighbours with dread and hate of her boundless ambition. Florence, which had at first helped her, afterwards joined Sforza against her.

While Venice was creating her state, the popes were recovering theirs. The rehabilitation of the papacy after its long degradation was a most remarkable phenomenon, and one of its consequences was that the popes assumed the character of Italian princes, rulers of a secular state. Using their nephews or illegitimate sons as the instruments or objects of their ambitious schemes, the popes became, in the last half of the century, the most disturbing factor in Italian politics, constantly endangering their stability by wild plans of territorial aggrandizement. The popes still asserted overlordship of S. Italy, and on this account frequently interfered in its affairs.

The decadent Angevins of Naples became extinct (1435) in the dissolute queen Joanna II., and their inheritance was disputed. Alfonso the Magnanimous succeeded in uniting it to his kingdoms of Aragon and Sicily, but at his death (1458) Sicily went to the legitimate Aragonese line, and Naples to Alfonso's only, but illegitimate, son Ferdinand. Naples was constantly disturbed by rival claimants, another line of French princes, the dukes of Anjou.

As in culture, so in politics, Italy in this age was the prototype of Europe in a later. A careful 'balance of power' was established between the states, and maintained by an elaborate system of alliance and skilful diplomacy. This was largely the work of the Medici and Lorenzo showed great skill in carefully holding the balance, and warding off the danger of French intervention. But this artificial arrangement had no real strength to hold Italy together; and it was Francesco Sforza, the ruler of Milan, who, out of personal hatred, invited Charles VIII. of France to put into force the claims to Naples which he had inherited from the dukes of Anjou. Charles was young and adventurous; he swept across the country unresisted, in mere light-heartedness allowing Florence to drive out the Medici and Pisa to recover her liberty, and Naples was his almost without a struggle (1494).

North Italy made one spasmodic effort to unite, and Charles had to retreat, barely escaping in safety. His example was followed by his successor, Louis XII., who had a claim to Milan through the Visconti. He was helped by Venice, which received in reward a slice of the duchy, and by Pope Alexander VI., who was intent on obtaining French assistance in the formation of a central Italian state for his clever, infamous son Caesar Borgia. Then Louis united to conquer and partition Naples with Ferdinand the Catholic of Spain, who claimed it as head of the legitimate Aragonese line; but the victors soon quarrelled, the French were ousted, and Naples became, like Sicily, a dependency of Spain (1504).

Next Venice, weakened by the Turkish wars, in which she was fast losing her Eastern dominions, hated by every one for her greed and self-sufficiency, was attacked by a league of European powers, and lost her mainland dominions in a few weeks (1509). Though she regained her possessions when the league fell to pieces, she never recovered her former strength.



The next fifty years were mainly occupied with a struggle of France and her enemies for the Milanese duchy, which ended in 1559. This contest formed part of the European strife between her and the house of Hapsburg. Swiss mercenaries, German lanzknechts, French and Spanish men-at-war trampled Italy under foot, and treated her as a conquered country. The popes took sides with a view to advancing their ambitious plans for the church and for their own families. Leo X., a Medici, obtained Spanish help to restore his family to Florence, overthrowing the republic which had been established there, largely under the influence of Savonarola. When the alliance of Clement VII., another Medici, with France had led to the terrible sack of Rome by German lanzknechts (1527), Florence again revolted; but in spite of her brave resistance, she was recaptured, and was restored to the Medici, who afterwards obtained (1555) the title of grand-dukes of Tuscany.

After the fall of Florence there is little real Italian history to record. Italy seemed dead, exhausted by her early development and the vehement splendour of her short life. Her brilliant people were sunk in apathy under the rule of foreign princes, who, with complete disregard for their welfare, treated her states as counters in the diplomatic game.

In Savoy and Piedmont there was a semblance of national life, because the rulers were native, and governed with commendable uprightness. Territorial expansion was their constant ambition; and though often nearly crushed by France, and losing to her the western part of their dominions, they expanded eastwards into Lombardy, and took advantage of the war of the Spanish Succession to obtain Sardinia with the title of king (1719).

Venice and Genoa, losing the last of their Eastern possessions to the Turks, preserved the independence of insignificance. Milan fell to the empire on the extinction of the Sforzas, and, with the rest of the Hapsburg dominions in Italy, went to Philip II. of Spain in 1541. The European powers continued to treat it as their battlefield, with constant campaigns in which the natives had no interest, but in which they suffered heavily. Till the end of the 17th century Spain ruled the peninsula: Milan, Naples, and Sicily belonged to her; the smaller princes of Central Italy were under her influence; the papacy depended upon her as the leading Roman Catholic power.

The war of the Spanish Succession (1700-13) led to a change in the rulers of Italy, and to a slight change in her condition. Austria succeeded to the Spanish dominions; and though in 1738 she had to give up the Two Sicilies to a junior branch of the Spanish Bourbons, she remained the dominant power, controlling the smaller states.

Nothing could have been worse than the administration of government by the Spanish viceroys, and S. Italy was in a constant ferment of ineffectual discontent. The Bourbon kings were an improvement, and the rule of Austria was comparatively just and humane, and was directed towards improving the material condition of the people; so also was that of the house of Lorraine, which succeeded the Medici in Tuscany in 1737. But the condition of the papal states was deplorable. The government was exclusively clerical, the Inquisition was all-powerful, and, as in S. Italy, the well-being of the people was utterly neglected, and they were sunk in laziness, ignorance, and poverty.

It was the Napoleonic invasions which first stirred the lethargic mass into consciousness of life, breaking for a time the Austrian yoke, and forcing the ideas of the French revolution upon the people. In 1796 the conqueror first swept into Italy, driving the Austrians before him; Nice and Savoy he had seized for France; Lombardy and part of Central Italy he constituted into the Cisalpine Republic, and the Genoese district into the Ligurian Republic, after the French model. Venice he forced to surrender its liberty, and then tossed it carelessly to Austria as a bribe for acknowledging the independence of his republics. After his departure Tuscany and Piedmont were annexed to France, the king of the latter retiring to Sardinia; republics, called the Roman and Parthenopean (in S. Italy), were founded—Ferdinand of Bourbon taking refuge in Sicily, where the British fleet protected him. When the Austrians again invaded Italy, the unstable republics fell rapidly before them; but in 1800 Napoleon returned, bringing his whole army over the St. Bernard pass. Defeating the Austrians at Marengo, he re-established the Cisalpine (now called the Italian) Republic, of which he himself became president. Venice was taken from Austria; Naples was made a kingdom, first for Joseph Bonaparte, then for Joachim Murat (1808); the temporal power of the popes was abolished.

It was for the Italians a time of great material prosperity, and

of civil liberty hitherto unknown; though there was little political liberty, since, after Napoleon became emperor, he was crowned king of Italy, and the constitution of the Italian republic fell into abeyance. Even Ferdinand of Sicily, under pressure from England, granted a modified constitution.

The kingdom of Italy fell with its king. The old governments were restored, Venice falling to Austria, Genoa to Savoy. The former rulers came back determined to crush out all popular manifestations by reactionary severity. The old privileges of nobles and clergy were restored, and all the old abuses; Austria, more powerful than before, proscribed all persons suspected of liberalism, and the smaller states followed her example. But Italy had learned too much to submit tamely: the secret society of the Carbonari fostered rebellions, which broke out in 1820-1 in Naples and Piedmont. Ferdinand of Bourbon had to grant a constitution, and permit the summoning of a parliament; but he played his people false, and called in an Austrian army, which soon crushed the disorganized constitutionalists. In Piedmont the Carbonari looked for support to Charles Albert, the heir-apparent; but when Austrian troops approached, Charles Albert fled, and the revolution soon collapsed. In 1831 there was a rebellion in the Papal States and in the duchies of Parma and Modena; this also was suppressed, and the expelled rulers were reinstated by Austrian troops.

Severe proscriptions followed these risings, and the policy of reaction and suppression seemed to grow worse than ever. In the north it was carried on by the Austrian minister Metternich, author of the famous phrase, 'Italy is only a geographical expression.' In the south the new king, Ferdinand II., surpassed his predecessors, and frequent outbreaks in Sicily and Naples were suppressed with ruthless severity. Even Charles Albert, who had now succeeded to Piedmont, seemed to have forgotten his former liberalism. Yet the spirit of liberty was living and growing. It was manifested in an outburst of patriotic literature, romances by D'Azeglio, the political theories of Gioberti, who advocated (1843) an Italian confederation under the presidency of the pope, and such books as Silvio Pellico's *Le mie Prigioni*, written from an Austrian dungeon. Mazzini, the youthful republican patriot, founded the Young Italy Society, with a view to improving the mass of the

population and fitting them for liberty.

The election of Pius IX. (1846), who, honestly wishing to improve the condition of the Papal States, began to grant moderate reforms, led to an outburst of popular enthusiasm. Leopold II. of Tuscany and Charles Albert of Piedmont, whose government was already superior to that of the other Italian rulers, followed the pope's example. Then Sicily and Naples broke into revolt, and forced Ferdinand II. to grant a constitution (1848). Immediately afterwards similar constitutions were promulgated by Charles Albert, Leopold II., and the pope.

Lombardy was in such a ferment of excitement that the government proclaimed a state of siege; but when the news of the French and Austrian revolutions of 1848 arrived, Milan and Venice rose in revolt, followed by the other towns of Lombardy. The Austrian garrisons were expelled, and driven to take refuge in the Quadrilateral. The rebels appealed to Piedmont, and Charles Albert, yielding to the popular demand, led an army to attack the Austrians. Tuscany sent him troops; even Pius and Ferdinand promised help. But the Austrian army, though smaller, was better commanded and disciplined. While Charles Albert was besieging Peschiera, Radetzky received reinforcements, and defeated the Tuscans at Curtatone; and though beaten at Goito, he inflicted a crushing defeat on the Piedmontese in the battle of Custoza (July 25, 1848). Charles Albert retired; the Austrians rapidly recovered Milan and all they had lost, except Venice, and early in the following year they invaded Piedmont. Charles Albert, defeated at Novara (March 1849), abdicated in favour of his son Victor Emmanuel, who had to make peace with Austria, paying a heavy war indemnity. The reactionary party was triumphant; Ferdinand of Naples dispensed with the constitution, and put down the Sicilian rebellion remorselessly. The bombardment of Messina was so cruel that it gained for him the nickname of 'King Bomba.' Pius IX. and Leopold II. had both long ago repented of their liberalism, and fled from their dominions. In Rome a republic had been set up under the influence of Mazzini and the volunteer soldier Garibaldi. But now the pope was restored by a French, and Leopold by an Austrian, army. Venice, led by the patriotic Daniele Manin, endured a long siege with great heroism, and only succumbed at last to cholera and famine. The old policy of

proscription and persecution was resumed in the Austrian dominions of Italy.

Only Sardinia kept her constitution, and, under the government of Victor Emmanuel and his wise ministers, D'Azeglio, La Marmora (minister for war), and Cavour, regained her prosperity, reorganized her finances and army, and deliberately prepared for a fresh effort to liberate Italy. Cavour soon took the lead, and in 1858 he induced Napoleon III. to enter into an alliance with Sardinia against Austria. In 1859 war broke out, and Napoleon brought an army

obliged to agree; but in the meantime Tuscany, Modena, and Parma had expelled their rulers, and now asked to be united to Sardinia. The offer was accepted, and, to obtain Napoleon's acquiescence, Savoy and Nice were ceded to him, so that the border between France and Italy was finally fixed at the Alps.

Next year Garibaldi led an expedition into Sicily, and, eagerly welcomed by the population, soon conquered the island, and afterwards the mainland state. In the face of European opposition, Victor Emmanuel had not dared to encourage the attempt



to the assistance of his allies. Together they invaded Lombardy, defeated the Austrians at Magenta, and entered Milan in triumph. The Austrians retreated to the Quadrilateral, and were again defeated at Solferino. But Napoleon, though he wished to free Italy from Austria, had never intended to unite her under Savoy; and when he realized that this would be the inevitable consequence of wholly defeating Austria, he hastily made peace at Villafranca, giving Lombardy to Sardinia, but leaving Venice in the hands of Austria. Victor Emmanuel was reluctantly

openly; but he now marched boldly across the Papal States, and joined Garibaldi, who had defeated the Bourbon troops at the battle of the Volturno. Victor Emmanuel soon completed the conquest; Naples and Sicily declared by plebiscite their desire to be united to Sardinia; and in 1861 Victor Emmanuel assumed the title of king of Italy.

Only Venice and the Papal States now remained to be joined to the new kingdom. To obtain Venice, Italy joined Prussia in her war against Austria in 1866; and though the Italians were beaten on land at Custoza and

on sea at Lissa, the triumph of Prussia was so complete that, by the peace of Prague, Venice was surrendered to Italy.

Rome it was less easy to secure, because of the opposition of Roman Catholic opinion throughout Europe. French soldiers had protected the pope ever since 1849. In 1862 Garibaldi prepared to make a dash on the Papal States, but the government felt obliged to stop him. He was surrounded on Mount Aspromonte and taken prisoner. The withdrawal of the French troops from Rome (1864) was only procured by a promise to respect the Papal States, and by the transference of the capital from Turin to Florence. In spite of the prohibitions of the government, Garibaldi made another attempt on Rome in 1867; but Napoleon sent more French troops, and Garibaldi was defeated at Mentana, and had to withdraw. It was not till the fall of the French empire in 1871 that the Italian government could act freely. As Pius IX. refused to give up the temporal power, the Italian government took the capital by force, and Pius withdrew to the Vatican, where he remained in voluntary confinement, a course followed by his successor, Leo XIII. (1878-1903), and by the present Pope, Pius X.

The consolidation of Italy into one nation cannot be said to be yet complete. Kings Victor Emmanuel (1871-8) and Humbert (1878-1900), well-intentioned and popular, were not born leaders. A strong republican element in the country has always been a source of difficulty; and still more distracting is the irreconcilable attitude of the Roman Catholic Church, which even up to 1905 forbade its people to take any part in political life.

The new kingdom, too anxious from the first to take its place amongst the great states, has overstrained its financial resources in the expenses of a large army and navy, and on public works; taxation has been heavy and caused much discontent, increased by the corruption known to exist amongst the official class. Pecuniary depression was intensified by the great building craze which at one time swept the Romans quite off their balance, and brought ruin to hundreds of speculators. Still more unlucky has been the attempt of the government to establish a colonial dominion on the Red Sea coast, which has brought nothing but waste of money and disaster, culminating in a terrible defeat at the hands of the neighbouring Abyssinians at Adowa. (1896), in which four thousand Italians were killed. In European politics Italy has been more fortunate.

As a member of the Triple Alliance, she has gained standing among the powers, while she has always kept on very friendly terms with Britain. King Humbert was assassinated, July 29, 1900, and was succeeded by his son, Victor Emmanuel III. Italy took part in the military expedition of the powers to China in 1900. The peninsula has suffered from many severe earthquakes within historic times, the most recent being that in Calabria in September 1905. See Gregorovius's *Hist. of the City of Rome in the Middle Ages* (Eng. trans. 1900, etc.); Vignati's *Storia diplomatica della Lega Lombarda* (1866); Salzer's *Ueber die Anfänge der Signorie in Oberitalien* (1900); Sismondi's *Histoire des Républiques Italiennes* (1809-18); Symonds's *Age of the Despots* (1882); Burckhardt's *Civilization of the Renaissance in Italy* (Eng. trans. 1890); Creighton's *Hist. of the Papacy during the Reformation* (new ed. 1897); Ranke's *Hist. of the Popes* (Eng. trans. 1842), and his *Latin and Teutonic Nations* (Eng. trans. 1887); Delaborde's *L'Expédition de Charles VIII. en Italie* (1888); Buser's *Beziehungen der Mediceer zu Frankreich* (1879); Cosci's *L'Italia durante le Preponderanze Straniere* (1879); Cantù's *Sulla Storia Lombarda del Secolo XVII.* (1842), and *Storia di Cento Anni, 1750-1850* (1851); Bolton King's *A Hist. of Italian Unity* (1899); Stillman's *The Union of Italy* (1898); Orsi's *Modern Italy* (Eng. trans. 1900); Ricotti's *Storia della Monarchia Piemontese* (1861); Datta's *Storia dei Principi di Savoia del Ramo d'Acacia, 1294-1418* (1832); Bianchi's *Storia della Monarchia Piemontese dal 1775 al 1861* (1877-85); and Cibrario's *Storia della Monarchia di Savoia* (1840-4). A great number of the contemporary authorities are in Muratori's immense collection, *Rerum Italicarum Scriptores* (1723-51), now being reissued. The most interesting among old and contemporary works is Guicciardini's *Istoria d'Italia* (1561; new ed. 1819).

Language and Literature.—Italian is one of the Romance languages, and not only was it the latest in developing from the Latin, but it has always, in its purest form, adhered more closely to the mother tongue than any of its sisters. The earliest definite traces of Italian speech may be found in a document of Monte Cassino, dated 960. For a variety of reasons, literary and political, Tuscan (and especially Florentine) has, almost from the beginning of the national literature, been the classical literary tongue of the peninsula. At the same time, there have always been a

great number of dialects, and to the present day these are largely spoken, even by the cultured natives of the several regions, though they are mostly able to employ the classical speech as well. These dialects have been arranged by Ascoli in a masterly scheme, of which this is the outline:—1. Dialects which depend in a greater or less degree on Neo-Latin systems not peculiar to Italy: (1) *Franco-Provençal dialects*; (2) *Latin dialects*. 2. Dialects which are detached from the true and proper Italian system, but form no integral part of any foreign Neo-Latin system: (1) The group of dialects which used to be called *Gallo-Italian*, and which is subdivided into (a) *Ligurian*, (b) *Piedmontese*, (c) *Lombard*, and (d) *Emilian*; (2) *Sardinian dialects*. 3. Dialects which diverge more or less from the genuine Italian or Tuscan type, but which, at the same time, can be conjoined with the Tuscan, as forming part of a special system of Neo-Latin dialects: (1) *Venetian*; (2) *Corsican*; (3) *Dialects of Sicily and of the Neapolitan Provinces*.

The earliest monuments of Italian literature, such as the *Ritmo Cassinese* (an allegorical spiritual dialogue) and the *Cantilena di un Guiliame*, belong to the first half of the 13th century. The first important and collective phenomenon is the mass of lyrical poetry produced by the Sicilian school. This derives directly from the Provençal troubadours, and it was at Palermo, at the brilliant court of the Emperor Frederick II., that the Provençal methods were first translated into Italian. Here we find all the conventions but little of the inspiration of the troubadours. Frederick himself, his son Enzo, his secretary Pier della Vigna, his falconer Jacopo Mostacci, and specially his notary and chancellor Giacomo da Lentini, represent the movement. A more popular tone is struck by Giacomo Pugliese (c. 1235), and by the important *contrasto* beginning 'Rosa fresca' (a dialogue between two lovers). In the second half of the century the seat of this lyrical poetry was transferred to Central Italy. In Tuscany, Buonagiunta of Luca, Chiaro Davanzati, and Rustico di Filippo show a certain amount of originality; but Guittone of Arezzo (d. 1294) is their chief. In his youth he followed the erotic manner, but later in life he preferred moral and religious themes. Guittone had a brilliant pupil at Bologna in Guido Guinicelli (b. c. 1240), who first developed the poetry of spiritual and ideal love in his famous canzone, *Al cor gentil ripara sempre amore*. Didactic and



allegorical poetry, based on the *Roman de la Rose*, was first cultivated by the Florentine, Brunetto Latini (c. 1220-94), in his Italian *Tesoretto* and French *Trésor*. During the whole century spiritual poetry was written in Umbria. St. Francis of Assisi (1182-1226) is generally credited with the *cantica del sole*; and Jacopone da Todi (1230-1306) was one of the chief cultivators of the *lauda*, a religious song, which, in its dialogue form, played an important part in the origin of the drama. N. Italy received from N. France a mass of epic material, most of which was dressed in the Venetian dialect, or in a hybrid tongue formed of French and Italian. Somewhat later in the 13th century N. Italy showed a preference for didactic and moral subjects, as clear from the poems of Ugucione da Lodi, Pietro da Barsegare, Giacomino of Verona, and Bonvicino da Riva. Italian prose begins about the year 1250. In addition to a number of translations, we have the epistles of Guittone of Arezzo, divers chronicles, didactic works such as the *Fiore di Virtù* of Gozzadini and the *Introduzione alla Virtù* of Bono Giamboni, and, above all, the short tales collected under the titles *Conti d'Antichi Cavalieri* (20) and *Novellino* (100).

If we regard the foregoing as the period of the beginnings, we may roughly characterize the period that follows (1283-1348) as the age of Dante. Guinicelli had introduced thought into his lyrics, and this mingling of idealized love and philosophy was developed in Tuscany by the school of the *dolce stil nuovo*, whose foremost representatives were Guido Cavalcanti (1265-1300) and his friend Dante Alighieri (1265-1321); Cino da Pistoia, Lapo Gianni, and the Frescobaldi being minor stars. Humour and satire were cultivated by Cecco Angiolieri, Folgore da S. Gemignano, Pietro de' Fatinelli, and others. The most perfect expression of the lyrical movement is to be found in the *Vita Nuova* and *Canzoniere* of Dante. Beautiful as are these works, and important as is the *Convivio* for the history of philosophy, the *De Vulgari Eloquentia* for the history of philology, and the *De Monarchia* for the history of church and state, it is the *Commedia* (called *Divina* by posterity) that entitles Dante to rank as the greatest poet of Italy, and as one of the three master-poets of the world. For passion and wisdom, for style, and as the expression of a mighty personality and of a great age, this wondrous narrative of a journey through hell, purgatory, and paradise has never been surpassed. Needless to say, the

fact that Italy produced her greatest literary work at so early a period was an important factor in the fixing of her literary language; while Dante's style, chastened on the model of the classics, was the earliest fruit of modern classical study, and a mighty harbinger—if, indeed, it was not the starting-point—of the renaissance. A poor imitator of Dante was Cecco of Ascoli (1269-1327) with his *Acerba*. Many poems of this time deal with contemporary manners and politics, and the *laude* were further developed. In the realm of prose, spiritual treatises were written, especially by Domenico Cavalca, and impassioned sermons preached by Giordano da Rivalto. The collections of various kinds (*fiore*, etc.) are most favourably represented by the *Fioretti di S. Francesco*; while the chronicle was brought a step nearer history by Dino Compagni (d. 1324), and especially by the great Giovanni Villani (d. 1348).

The next hundred years paved the way for the renaissance. Humanistic studies may be traced back into the 9th century; but if we exclude Dante, the first important Italian humanist was perhaps Albertino Mussato (1261-1329), with his Latin chronicles and the Latin tragedy *Eccerinus*. Giovanni del Virgilio is interesting chiefly for his bucolic correspondence with Dante. Far greater than these was Francesco Petrarca (1304-74), whose familiar epistles, historical fragments, *Africa* (an epic), and contemplative works are written in Latin, and testify to a great knowledge of all pertaining to Rome. Greek studies, too, were furthered by him. But it is, of course, as a lyrical poet that Petrarch has come down to posterity, and that his influence throughout Europe was so prodigious. Nor can the exquisite perfection of these poems be denied, in spite of all their artificiality. The next mighty figure of the classical revival is Giovanni Boccaccio (1313-75), whose Latin works on the genealogy of the gods and on the famous men and women of antiquity are monuments of learning. He distinguished himself also as a Dante lecturer and biographer, and his *Amorosa Visione* testifies to Dante's influence (which Petrarch, too, had undergone in the *Trionfi*). The *Decamerone* has caused Boccaccio's other narratives in prose and verse to be forgotten save by the student, and this collection of one hundred prose tales marks the highest achievement of the genre. The style is no less admirable in its way than the knowledge of human nature and the humanity

displayed, and the book served as a source from which great writers of every nation borrowed their plots. The period produced numerous imitators of the three great Tuscans, and these aimed at pleasing the people rather than the learned. The lyricists are scarcely worthy of mention; but among Dante's followers Fazio degli Uberti and Frezzi have at least a historical interest. Boccaccio had a distinguished disciple in Franco Sacchetti (c. 1330-1400), while Ser Giovanni da Firenze (*Pecorone*, c. 1378) and Giovanni Sercambi (1317-1424) have considerable, if less, merit. Popular, too, were the didactic efforts of Jacopo Passavanti (1300-59) and S. Catherine of Siena (1347-80), while Antonio Pucci (1310-90) dealt in popular poems with contemporary events. In the first half of the 15th century, again, while the large majority of the humanists, men of the greatest gifts, were carrying on the classical tradition in Latin works which cannot be dealt with here, some of them realized the importance of introducing something of the manner and matter of the ancients to the people by speaking to them in their own tongue. Foremost among these were that universal genius Leon Battista Alberti (1407-72), with his *Della Famiglia*, and Matteo Palmieri (1406-75), with his *Della Vita Civile*. Among the people themselves, of course, the popular aspects of literature were never neglected. The Florentine Domenico di Giovanni, called 'Il Burchiello' (1404-48), wrote a number of *sonetti caudati* of a jocose and burlesque description, dealing with contemporary matters. The wandering *improvisatore* Niccolò, the 'blind man of Arezzo' (d. 1440), and Antonio di Meglio (1384-1448) belong to the same class. The artificial love poetry assumed a more popular character in the songs of Lionardo Giustiniani (1388-1446), and the French epics, which had long been sung in the public squares by mountebanks, were written down by Andrea Magnabotti of Barberino in a prose version which is still popular. The priests naturally opposed the humanists for preferring the classics to Holy Writ and the holy legends, and Giovanni Dominici (1356-1419) led the attack. Popular preachers such as Bernardino degli Albizzeschi (1380-1444) also addressed the people only, and the dramatic *laude* (now called *rappresentazioni*) grew in number and importance. Finally, there were several writers of tales who carried on the tradition of Boccaccio. Masuccio dei Guardini, who finished his collection in 1460, is the foremost, and Giovanni Sab-

badino degli Arienti (*Le Porrettane*, 1478) is worthy of mention. Longer novels are the *Hypertomachia Poliphili* (c. 1450), written probably by Frate Francesco Colonna (reissued in facsimile, Lond. 1905), and the *Pellegrino* (c. 1500) of Jacopo Caviceo. The only Petrarchist of importance is Giusto de' Conti (d. 1449).

And now we come to the glorious period of the renaissance (roughly from 1450-1580). In Florence, at the court of the Medici, the Neo-Platonic ideas had found a home since the days of Cosimo, who had encouraged Marsilio Ficino (1433-99) to study this philosophy. Cosimo's grandson Lorenzo (1449-92), who ruled from 1469, developed the movement, and in the 'seventies the Platonic Academy was founded, the two greatest members of which, Ficino and Pico della Mirandola (1463-94), adapted Plato and Aristotle to current ideas. Lorenzo himself was no mean poet. His love poetry is imbued with Platonism, but in other works (such as the carnival songs and the *laude*) he is quite popular; indeed, he never forgot the popular literary traditions of his country, and though he parodied some of the forms, this was only done in jest. Poliziano (1454-94), whose genius was fostered by Lorenzo, was a classical scholar of brilliant attainments. He wrote much beautiful poetry, both in Latin and Italian. The legend of *Orfeo*, treated in the form of a *rappresentazione*, and the *Stinze per la Giostra* are among the gems of Italian literature. Another of Lorenzo's protégés was Luigi Pulci (1432-84), whose *Morgante Maggior* celebrates the deeds of the French epics in *ottava rima*. In many ways he breathes the spirit of his predecessors, the mountebanks, especially in the simplicity and directness of his manner; his greatest distinction is his humour. Again, it was Lorenzo who called to Florence the great Savonarola (1452-98). At the Neapolitan court there was a parallel movement. Giovanni Pontano (1426-1503), head of the Neapolitan Academy, wrote only in Latin, but no one since the classical period has handled it with greater beauty of style. His friend Jacopo Sannazaro (1458-1530) composed in Italian as well as in Latin. His *Arcadia* (c. 1481) became the model of all the later pastoral romances. He was a Petrarchist, too, as were others at that court (Jacopo de' Jennaro, Benedetto Garret—known as 'Il Cariteo'—Ciminelli), who developed the artifices of their master. In the north this tendency to uninspired Petrarchism was even more marked (Bellincioni, etc.). The only great northern poet of

this early renaissance period was Bojardo (1434-94), whose *Orlando Innamorato* treats the same themes as Pulci's poem, and in the same form, but in a totally different spirit. The courtly manner, the Breton mystic element, and classical features are woven into the original groundwork, with the result that we have here the first romantic epic. The style is not free from dialect forms and solecisms—a defect which Berni and Domenichi tried to remedy (in 1541 and 1545).

The second or classical period of the renaissance is distinguished by one national, classical, literary tongue. We may pass over the theoretical aspect of this question and the struggle between the purists headed by Bembo (who maintained Florentine of the 14th century to be the one literary tongue) and those who favoured the introduction of forms from other dialects. Suffice it to say that the former triumphed. Ariosto (1474-1532), if compared with Bojardo, marks this change most completely. He is superior to his predecessor (whose theme he continues) in imagination, and he breathes more fully the spirit of the renaissance; but it may be doubted whether these qualities would have helped the *Orlando Furioso* to triumph through the ages if it had not been for the absolute perfection of its manner. Ariosto's other works—the comedies, lyrics, and satires—would have sufficed for a smaller reputation. Niccolò Machiavelli (1469-1527) is the exponent of the statesmanship of his age, and has sometimes been wrongly held responsible for advocating a state of things he was merely describing. His works of this class (*Arte della Guerra*, *Discorsi sopra la Prima Deca di T. Livio*, *Il Principe*, and *Istorie Fiorentine*) are based on a close and penetrating study of Roman antiquity and of his own age. Among his minor works the *Mandragola* is one of the most brilliant comedies of the time. Francesco Guicciardini (1433-1540) wrote dispassionate and masterly histories of Florence and Italy. The notorious Pietro Aretino (1492-1536) represents the age in its utter lack of moral consciousness, no less than in its wonderfully developed æsthetic sense. The former element is displayed in his comedies and dialogues, the latter in his tragedy of *Orazia*, while both qualities are conspicuous in the valuable collection of letters. As we saw, Cardinal Pietro Bembo (1470-1547) headed the linguistic purists in theory. In practice, too, he may be accounted one of the most eminent Petrarchists in an age which numbered among its

lyric poets writers of the stamp of Guidiccioni, Molza, Caro, Della Casa, Alamanni, Vittoria Colonna, and—greatest and deepest of all—Torquato Tasso and Michael Angelo. In prose the classical theories are best represented by the letters of Aretino, Bembo, and Caro, and by two masterly treatises on manners in dialogue form—the *Cortegiano* of Baldassare Castiglione (1478-1529) and the *Galateo* of Giovanni della Casa (1503-56). Anti-Petrarchist in tendency were Castaldi (1480-1536) and Tolomei (1492-1555), who endeavoured to put an end to the conception of poetry as a mere display of rhyming. The forms of the ancients were again held up as models. Trissino introduced blank verse into his tragedy of *Sofonisba* (1515), while Giraldis (1504-73) imitated Seneca, as in the *Orbecche*. It was Trissino, again, who produced a classical epic in the *Italia Liberata dai Goti*, but he found no imitators. On the contrary, his failure induced Luigi Alamanni (1495-1556) and Bernardo Tasso (1493-1539), the father of Torquato, to return to the romantic epic in *Girone il Cortese* and *Amadigi di Gaula*, though it is true they endeavoured to preserve some of the rules of classical poetics. Virgil's *Georgics* served as a model for didactic poems like the *Api* of Ruellai and the *Coltivazione* of Alamanni, while Ercole Bentivoglio imitated Horatian satire. The comedy of Terence and Plautus, mingled in various degrees with local colour, was cultivated in the plays of Ariosto, Machiavelli, and Aretino, to which allusion has been made. Another important representative of the school was Bernardo Dovizi di Bibbiena (1470-1520) with his *Calandria*, which was acted in 1513—lesser lights being Firenzuola, Grazzini, and Cecchi. Popular in character were the farces of Tuscan (such as those acted by the *Compagnia de' Pazzi* of Siena); while the *commedia dell'arte* of N. Italy, which dates from about 1550, was largely a matter of improvisation round a fixed *scenario*. Its characters—the *pantalone*, *arlecchino*, *pulcinello*, etc.—have become European types. Classical and popular elements appear in the serious short tales (the *Hecatommithi*) of Matteo Bandello (1490-1560); in Grazzini, known as 'Il Lasca' (1503-83), whose *Cene* are more in Boccaccio's manner; and in Firenzuola, with his obscene *Ragionamenti d'Amore*. The latter's *Prima Veste de' Discorsi degli Animali* has Oriental elements—a trait that is even more conspicuous in the *Piaceroli Notti* (1550-7) of Straparola. The fascinating autobiography of

Benvenuto Cellini (1500-71) almost belongs here, so largely is it composed of truth and fiction. The romantic epic was parodied by Teofilo Folengo (1492-1543) in his *Merlino Coccato*, written in macaronic Latin prose (a comic mixture of Latin and Italian); while Francesco Berni (1497-1535) was the great parodist in verse of the many love-poets of the age. This great period is closed by the tragic figure of Torquato Tasso (1544-95), who endeavoured, in his *Gerusalemme Liberata*, to voice a deep and sincere religious feeling. Nothing can detract from the beauty and passion of the episodes and characters of this great poem; while the pastoral play *Aminta* remains unsurpassed—even by the *Pastor Fido* of Guarini (1538-1612), and by Fletcher's *Faithful Shepherdess*.

The primary causes of the long period of decline into which Italian literature now fell (1580-1750) were three—the counter-reformation, the political supremacy of Spain in Italy, and the petrifying influence of the Accademia della Crusca (founded at Florence in 1582). One of the first signs of decadence was the rapid and bombastic style of poetry called *Marinismo*, after Giambattista Marino (1569-1625). His epic, *Adone* (1623), was copiously imitated not in Italy alone, but throughout Europe. The classical lyrical tendencies of Chiabrera (1552-1638) and Testi (1593-1646) constituted a wholesome reaction, but were powerless to improve the general taste. The *commedia dell'arte* supplanted the regular drama more and more. The numerous imitations of the two classical pastorals ended in the combination of this type of play with music; and in this way the first opera was produced in 1594—O. Rinuccini's *Dafne*, set to music by Peri and Caccini. Tasso was brilliantly parodied by Alessandro Tassoni (1565-1635) in his *Secchia Rapita*, and the ancient mythology, of which so much use was being made, by Bracciolini (*Scherzo degli Dei*, 1626); a century later Forteguerra (1674-1735) published a somewhat belated parody of the romantic epic (*Ricciardetto*). That the prose of this period was not free from bombast is shown by the enormously popular pastoral novels, which were imitated from Spanish and French models. At the same time, a more select and discriminating public was addressed by speculative writers, such as Giordano Bruno (1548-1600) and Campanella (1568-1639), and, above all, by the great founder of the empirical method in natural science, and of modern scientific prose—Galileo Galilei (1564-1642). We may take the

year 1642 as forming the end of the first period of decadence, the second being characterized by various attempts at reform. Satirical writers such as Salvatore Rosa (1615-73), Menzini (1646-1704), and Sergardi (1660-1726) inveighed against various aspects of the prevailing bad taste; while, here and there, poets like Filicaja (1642-1704) and Redi (1626-98) gave promise of better things. Literary academies—the multiplication of which is always a mark of decline—developed from the Neo-Platonic institutions of the 16th century. The 'Academy of Arcadia', founded at Rome in 1690, soon spread over Italy, and long wasted its energies in endeavouring to improve the national literature, without paying any heed to the crushed national spirit, which was at the root of the whole evil. Among the earliest Arcadians the literary historians Crescimbeni (1663-1728) and Gravina (1664-1718) did useful work. The original band of poets, such as Francesco di Lemene (1634-1704) and Zappi (1671-1719), were still under the ban of *Marinismo*. The second Arcadian period shows signs of improvement in the poems of Crudei (1703-45) and Rolli (1687-1765), but especially in the brilliant melodramas of Pietro Metastasio (1698-1782), written as opera and oratorio texts. These reveal real dramatic instinct, and considerable powers of invention and characterization, while the style is poetical and free from exaggeration. The third period is most favourably represented by the dignified productions of Frugoni (1692-1768), who excelled in unrhymed *endecasillabi*. In the drama proper Martelli (1655-1721) imitated the French tragedies, including the use of the Alexandrine (called from him *versi martelliani*). Scipione Maffei (1675-1759) went back to the Greeks for his astoundingly successful *Merope* (1713), while Antonio Conti (1677-1749) was the first Italian to come under the influence of Shakespeare, and is considered the precursor of Alfieri. Prose was handled with distinction by several scholars—by Vico (1668-1744), who may be regarded as the founder of the philosophy of history; by Apostolo Zeno (1669-1750), who wrote excellent literary criticism; by Mazzuchelli (1707-68), whose *Scrittori d'Italia* forms the first great series of biographies; and by Muratori, whose collections of early historical documents testify to wonderful industry and scholarship.

The age of revival, known as the *Risorgimento*, which precedes the modern period, occupies about a hundred years (1750-1850). It

had been prepared by men like Machiavelli, Bruno, Galilei, and Vico, and now additional impetus was forthcoming from England and France. The academies were supplanted by reviews on the English model, such as the *Osservatore* (1761) of Gaspare Gozzi (1713-86) and the *Frusta Letteraria* (1763) of Giuseppe Baretti (1719-89). Giuseppe Parini (1729-99) produced a satire of permanent value in his *Il Giorno*: its form is borrowed from the ancients, but its social ideas are derived from France. Carlo Goldoni (1707-93) made a courageous attempt to supplant the *commedia dell'arte* by his comedies, admirably sincere pictures of the Venetian life he knew so well. The twenty-two tragedies of Vittorio Alfieri (1749-1803) represent an earnest endeavour to found a national Italian drama; but in spite of the poet's undoubted genius, most of them lack vitality. Still, the artistic intent is undeniable, and had the most beneficial effect on the country's literature. The works of Vincenzo Monti (1754-1828) advocate the most various political ideals, but their manner (notably in the *Bassavilliana*) is admirable, and based on a close study of the best Italian and foreign models. All that Ugo Foscolo (1778-1827) wrote—the Werther-like *Ultime Lettere di Jacopo Ortis*, the *Sepolcri*, and the tragedies—is distinguished by a classical beauty and dignity of style. Together with Girolamo Tiraboschi (1731-94), he also represents the best literary criticism of the time. The most important among the disciples of these writers was the lyrical and dramatic poet Ippolito Pindemonte (1753-1828). In prose the historical works of Carlo Botta (1766-1837) are remarkable both for style and for the national spirit they breathe. Indeed, this latter quality, no less than style, distinguishes much of the best work of the period. The Italian romantic movement was heralded by Cesarotti's translation of *Ossian* (1763) and by the Dantesque religious *Visions* of Varano (1705-81). Milton, Young, Rousseau, and Klopstock were read and absorbed by men like Monti. Gaspare Gozzi's *Difesa di Dante* (1758) reawakened general enthusiasm for the great Florentine. Interest in the middle ages was restored (Muratori, etc.). The chief of the Italian romanticists, Alessandro Manzoni, was born in 1785 and died in 1873—thus outlining the movement, as Victor Hugo did in France. The *Inni Sacri* (1812-22) and the *Cinque Maggio* (1821) testify to great lyric gifts, while the *Conte di Carmagnola* and the *Adelchi* (1817-22) are powerful historical trage-

dies in the Shakespearean manner. Manzoni's masterpiece, the *Promessi Sposi*, first appeared in 1827, and was then republished, in a purer style, in 1840. Here Scott's is the dominating influence. The historical and personal threads are skillfully intertwined, and the masterly picture of Italy under the Spanish yoke in the 17th century did more than any other work to awaken the sense of liberty and the desire for a united Italy. Manzoni's political and religious tendencies are best represented by Giovanni Berchet (1783-1851) and Silvio Pellico (1789-1854). His historical novel was imitated, with more or less distinction, by Grossi, Guerrazzi, and D'Azeglio. The romantic drama, which like the novel was often political in aim, was most successfully cultivated by Giambattista Niccolini. Giuseppe Niccolini gave further impetus to the movement by his translations of Scott and Byron, while its theories were expounded by Manzoni himself, Luigi Carrer (1801-50), Nicolò Tommaseo (1802-74), and Giuseppe Mazzini (1808-72). Satire was cultivated by Giuseppe Giusti (1809-50) in pure Tuscan, and by Giuseppe Belli (1791-1863) in the Roman dialect. The political aspirations of the age were most directly expressed by Gino Capponi (1792-1876), Cesare Balbo (1789-1853), and Vincenzo Gioberti (1792-1876). The works of Rosmini-Serbati (1797-1855) are indispensable to the student of the philosophy, religion, and politics of the time. Italy's greatest lyrical poet since the 14th century appeared in Giacomo Leopardi (1798-1837), whose perfect manner is based on a profound study of the classics. In his poetry and in his prose he was a bitter pessimist. Pietro Giordani (1774-1848) was another worthy upholder of classical traditions.

The transition to the modern period is marked by the patriotic poems of Francesco dall' Ongaro (1808-73), Domenico Carbone (1823-83), and Luigi Mercatini (1821-72). The romantic spirit with classical elements is found in the poems of Giovanni Prati (1815-84). The banner of revolt against romanticism was raised by Italy's greatest contemporary poet, Giosuè Carducci (b. 1836), whose grand classical manner has gone on growing in strength ever since the *Juvenilia* appeared in 1857. His foremost disciple is perhaps Giovanni Pascoli (b. 1855). The muse of Olindo Guerrini, known as Lorenzo Stecchetti (b. 1845), shows French influence, and is more sensuous. Ada Negri (b. 1870) utters the socialistic cry of the age. Other lyricists of eminence are Domenico Gnoli (b. 1836), Arturo Graf (b. 1848),

and Enrico Panzacchi (1841-1904). The drama gradually became realistic, though Pietro Cossa (1830-81) is still frankly historical, while Paolo Ferrari (1822-89) is at his best in dramatizing episodes of literary history. Giuseppe Giacosa (b. 1847) and Gerolamo Rovetta (b. 1854) represent the modern tendencies in drama, while in comedy the distinguished names are Gherardi del Testa (1818-81), Ferdinando Martini (b. 1841), and Vittorio Bersezio (1830-1900). Among the novelists, Barrili (b. 1836) and Salvatore Farina (b. 1846) are comparatively untouched by the realistic movement. But Giovanni Verga (b. 1840), with his Sicilian peasant tales, led the way in realism. Antonio Fogazzaro (b. 1842) reveals much earnest talent in his novels, which mingle realism with romantic and Catholic aspirations. Matilde Serao (b. 1856) has many admirable qualities to atone for defects due to a journalistic training. Edmondo de Amicis (b. 1846) deserves mention for his voluminous writings (tales, sketches, travels, etc.), which are perhaps the most popular in Italy, and are distinguished by a real sense of style. The country is rich in scholars like Carducci, D'Ancona, De Sanctis, Ascoli, Graf, Villari, Comparesi (to name but a few), whose contributions to science (philology, history, etc.) often attain the level of literature. We close our survey with the name which represents the literary aspirations of young Italy—that of D'Annunzio (b. 1864). Alike as a lyrical and narrative poet, as a writer for the stage, and as a novelist, he has produced remarkable work. It contains the most varied elements—realistic, classical, romantic, symbolical—and is based on a wide study of literature, Italian and foreign. That he is a master of style is universally conceded; also that he is capable of lofty thought.

Italian, as a romance language and as compared with its sister tongues, is best treated in the romance grammars of Diez (4th ed. 1876-7) and Meyer-Lübke (1890-1902). The latter has also dealt with Italian in a separate work (1890); and together with D'Ovidio, in vol. i. of Gröber's *Grundriss der rom. Phil.* (1888). An excellent general account of the literary tongue and the dialects was contributed by Ascoli to the ninth edition of the *Encyclopædia Britannica*. The best history of Italian literature, that of Gaspary, was unfortunately interrupted by the author's death. The two volumes that have appeared (1885-8) bring us as far as the counter-reforma-

tion (exclusive of Tasso). An English version of this history down to the death of Dante appeared in 1901; and there is a complete Italian translation. English readers should study J. A. Symonds's *Italian Renaissance* (7 vols. 1875-86), especially the volumes on the literature, and Garnett's *Short History of Italian Literature* (1898). An excellent illustrated account of the whole period (in German) is that of Wiese and Percopé (1898-9; Italian trans. 1900, etc.). Casini wrote a scholarly history of the subject (for vol. ii. of Gröber's *Grundriss der rom. Phil.* 1896), the bibliography of which is invaluable. Though Casini is an Italian scholar, this work, too, is in German. Other leading Italian historians of their literature are: Crescimbeni (best ed. 1730-1); Tiraboschi (2nd ed. 1787-94); Emiliani Giudici (2nd ed. 1865); Settembrini (1868-70); De Sanctis (1870-1); Bartoli (7 vols. 1878-89—to end of 14th century); Fornaciari (5th ed. 1885); Finzi (4 vols. 1887-9); Rossi (2 vols. 1900); and Ferrari (2 vols. 1901). Finally, mention must be made of the important *Storia lett. d'Italia scritta da una Società di Professori*, consisting of 9 vols.; Giusani's *Let. Romana* (1898); Novati's *Origini della Lingua*; Zingarelli's *Dante* (1903); Volpi's *Il Trecento* (1900); Rossi's *Il Quattrocento* (1900); Flamini's *Il Cinquecento* (1902); Belloni's *Il Seicento* (1900); Concari's *Il Settecento* (1900); Mazzoni's *L'Ottocento* (1904). For an account of Italian art, see PAINTING and SCULPTURE.

Itasca, LAKE. See MISSISSIPPI.
Itch, or SCABIES, is a highly contagious skin disease, caused by a minute parasite, the *Sarcoptes scabiei*, which burrows and deposits eggs beneath the human skin. The delicate integument between the fingers is the most usual habitat of the parasite, which may, however, invade other parts. It is communicated from one patient to another, and is most common among neglected and unwashed children. The irritation caused by the burrowing of the parasite leads to scratching, which spreads the disease and often induces extensive eczema. Scabies is usually easily cured by cleanliness and the application of sulphur ointment, which should be rubbed well into the affected skin for several nights in succession. In more obstinate cases treatment with stronger antiseptics may be necessary. The *Sarcoptes scabiei* is often wrongly called the itch 'insect'; it is really a mite, and belongs to the zoological class Arachnida.

Itchen, E. suburb of Southampton, Hants, England. Pop. (1901) 13,097.

Itch Mite (*Sarcoptes scabiei*), a small mite parasitic on man. The young, after hatching, begin to burrow under the skin, producing great irritation. An allied form causes mange in dogs and other domestic animals. Both species are exceedingly prolific. Of the four pairs of legs, the anterior two bear suckers, and the posterior two bristles.

Ithaca. (1.) Now Thiaki, one of the Ionian Islands, off the coast of Epirus (Turkey), immediately E. of Cephalonia. Area, 37½ sq. m. Pop., with Cephalonia (1896), 11,049. It is famous as having been the home of Odysseus. Chief modern town, Vathy, with pop. (1896) 4,697, in s. half of the island, on a deep and beautiful bay. Chief products of island are wine, currants, and oil. (2.) City, New York, U.S.A., co. seat of Tompkins co., at the head of Cayuga L., 48 m. s.w. of Syracuse, in a region noted for its fruit. Ithaca is the seat of Cornell University. Pop. (1900) 13,136.

Ithome, mountain in Messenia, in ancient Greece, on which stood the chief fortress of the Messenians in their war with Sparta during the 7th and 6th centuries B.C.

Itinerary, the Roman name for a description of all the roads (*itineraria*) in the Roman world. The *Itinerarium* was either *scriptum* ('written'—a sort of guide-book, giving a list of the stations and their distances) or *pictum* ('pictorial'—a kind of chart). Several of the former class have come down to us, and were published by D'Urban at Paris in 1845. Of these, the *Itineraria Antonini* and the *Itinerarium Hierosolymitanum* are the most important. The *Tabula Peutingeriana* is the only extant specimen of the second class.

Ito, MARQUIS HIROBUMI (1838), Japanese statesman. When a young man of about twenty-six, he was one of a small band of spirited young Japanese who came to Europe to gain some personal knowledge of Western nations. After his return from England, the overthrow of the Tycoon government was followed by a social and political revolution in which Ito played a conspicuous part. He was appointed minister of public works in the central government at Tokyo; and his career culminated in his becoming prime minister in 1886. He has held this high office four times, the last term ending in May 1901. During all these years he laboured unceasingly at the work of reorganization and reconstruction in Japan. He guided and encouraged the remarkable military and industrial development which has

now placed his country amongst the great powers of the world. The constitution under which Japan is now governed is the work of the Marquis Ito. In 1889 the Mikado, who honours him with his intimate confidence, selected him to proceed to Europe to study the forms of constitutional government in the various nations of the West. It was upon the results of this study and observation that he based the Japanese constitution.

Iuka, tn., cap. of Tishomingo co., Mississippi, U.S.A., 22 m. s.e. of Corinth; was the scene of an indecisive battle between the Federals under Rosecrans and the Confederates under Price on Sept. 19, 1862. It possesses mineral springs. Pop. (1900) 882.

Iulus. See ASCANIUS.

Ivan, the name of several rulers of Russia. IVAN I. succeeded Alexander II. in 1328, and took the title of Grand-duke of Moscow; he afterwards



The Marquis Ito.

[Photo by W. & D. Downey.]

Ittu, or ITU, tn., São Paulo state, Brazil, on the Tiete R., 70 m. w.n.w. of São Paulo; has iron and bronze foundries and cotton factories. Pop. 10,000.

Iturea, dist. of ancient Syria, supposed to have been situated in N.E. Palestine, between Damascus and Lake of Tiberias.

Itzehoe, tn., Prussian prov. of Schleswig-Holstein, 44 m. by rail n.w. of Hamburg. Founded in 809, it was down to 1864, the meeting-place of the estates of Holstein. Pop. (1900) 15,649.

entered a monastery, where he died in 1350.—IVAN III. (Vassilievitch), or IVAN THE GREAT (1440–1505), succeeded his father in 1462, and delivered his people from the Tartar dominion. He also fostered art, learning, and industry, and introduced civil legislation. He took the title of 'Monarch of All the Russias.'—IVAN IV. (Vassilievitch), known as IVAN THE TERRIBLE (1530–84), ruled from 1533, and was the first to adopt definitively the title of Czar; a vigorous reformer both of justice

and commerce, but became cruel in his later years. He conquered Kazan and Astrakhan, and annexed Siberia; curbed the power of the nobles; and in 1553 concluded a commercial treaty with Queen Elizabeth of England.—IVAN VI. succeeded his aunt, the Empress Anna, in 1740, at the age of three months; but was deposed and put to death in prison in 1764.

Ivanovo-Voznesensk, industrial settlement of Vladimir gov., Central Russia, 60 m. N.N.E. of Vladimir; manufactures linen and printed goods, and has cotton mills, chemical works, iron and copper foundries. Often called the Russian Manchester, it is one of the most rapidly growing towns in the empire. Pop. (1897) 53,949.

Iveagh, LORD (1847), better known perhaps as Sir Edward Cecil Guinness, at one time head of the great firm of brewers of that name in Dublin. The business of Messrs. Guinness Brothers was purchased by a limited liability company for £5,200,000 (Oct. 22, 1886), and Sir Edward Guinness retired from the firm in 1889. To signalize this event, he placed in the hands of the late Lord Rowton, Mr. Ritchie, and Mr. Plunket (now Lord Rathmore) the sum of £250,000, to be held in trust for the erection of dwellings 'to be let at such rents as shall place them within the reach of the poorest of the labouring population.' Of this amount, £200,000 was to be expended in London, and the remainder in Dublin. These funds are now administered by the London and Dublin Guinness Trusts for Housing the Poor. At a later period, Sir Edward, who was raised to the peerage as Baron Iveagh in 1891, cleared an insubstantial area of about seven acres in the heart of Dublin at his own expense. Part of this area is being laid out as a public garden, and the remainder is being rebuilt as workmen's dwellings, a 'Rowton' lodging-house, a public concert hall, swimming baths, old clothes market, etc. The cost of this scheme was nominally estimated at £250,000, but it will very largely exceed this sum. All the income is to go in support of the concert hall and the other special buildings, and towards the erection of further new dwellings. He also gave £250,000 for the further endowment of the Jenner Institute of Preventive Medicine, London, in 1898. During the Boer war (1899-1902) Lord Iveagh equipped, sent out, and maintained at his own cost the Irish field hospital for the use of the British troops in South Africa; and in August 1903, to mark the visit to Dublin of the King and Queen, he gave to his Majesty the sum of £50,000 for division amongst the Dublin hospitals.

Lord Kensington's London estate was purchased at auction by Lord Iveagh for £565,000.

Ives, FREDERIC EUGENE (1856), American inventor, born at Litchfield, Connecticut; engaged since 1874 in the problem of taking photographs in natural colours. In 1886 he invented the process of half-tone photo-engraving, and in 1888 the photochromoscope, which combines the three negative images produced by a single lens in a special camera into one positive image in natural colours. He obtained the gold medal of the Franklin Institute in 1893. He has published *Isochromatic Photography* (1886), *A New Principle in Heliography* (1889), and *The Photochromoscope* (1894).

Ivinghoe, par. and mrkt. tn., Buckinghamshire, England, 9 m. E. of Aylesbury. It is chiefly engaged in straw-plaiting. Pop. (1901) 1,895.

Iviza, or **IBIZA**. (1.) One of the Balearic Isles, Spain, 60 m. S.W. of Majorca. Area, about 230 sq. m., and pop. (1900) 23,648. Cereals, oil, and fruit are largely grown, but the principal wealth is derived from lead mines. Salt is obtained by evaporation. There are two good harbours, Iviza and Puerto Magno. (2.) Capital of above island, is the seat of a bishopric. There are a cathedral and a fortress built by Philip v. Pop. (1900) 6,327.

Ivory, the name given to the variety of dentine composing the prolonged incisors or tusks of elephants. These teeth grow to a great size, single specimens sometimes weighing over two hundred pounds, and possess the peculiarity that they spring from permanent pulps, and continue to grow as long as the animal lives. The word ivory is also applied less strictly to similar substances obtained from the hippopotamus, narwhal, walrus, etc. The best ivory comes from that part of Africa which lies within 10° N. and 10° S. of the equator, and Antwerp is now the chief market. African elephants of both sexes furnish ivory, though the tusks of the males are the larger. In the Indian species the females are mostly tuskless, while the tusks of the males are inferior both in size and in quality, their material being coarser in grain, less 'waxy' and translucent, and more liable to turn yellow, than the African variety. Mammoth 'fossil' ivory is little valued, as being too 'dry' and brittle.

The price of ivory varies from about £10 to £90 per cwt., the largest tusks being the most valuable. At one time it was feared that the supply of ivory would soon run out, but it appears that the native tribes store their ivory, and possess the produce of cen-

turies. They barter with the traders the so-called 'dead' ivory from the bottom of the pile, so that the 'live' ivory of elephants recently killed (which commands a higher price) forms but a small portion of the supply.

The uniformity and fineness of the texture of ivory, its mellow tints and delicate translucency, its very perfect elasticity, and the readiness with which it adapts itself to the carver's art, are among the many valuable qualities that have for ages given it its unique position as a material for all sorts of articles, instruments, and ornaments. Many attempts have been made to find a satisfactory substitute for ivory, but with only partial success. Celluloid, though a material in some respects even superior to



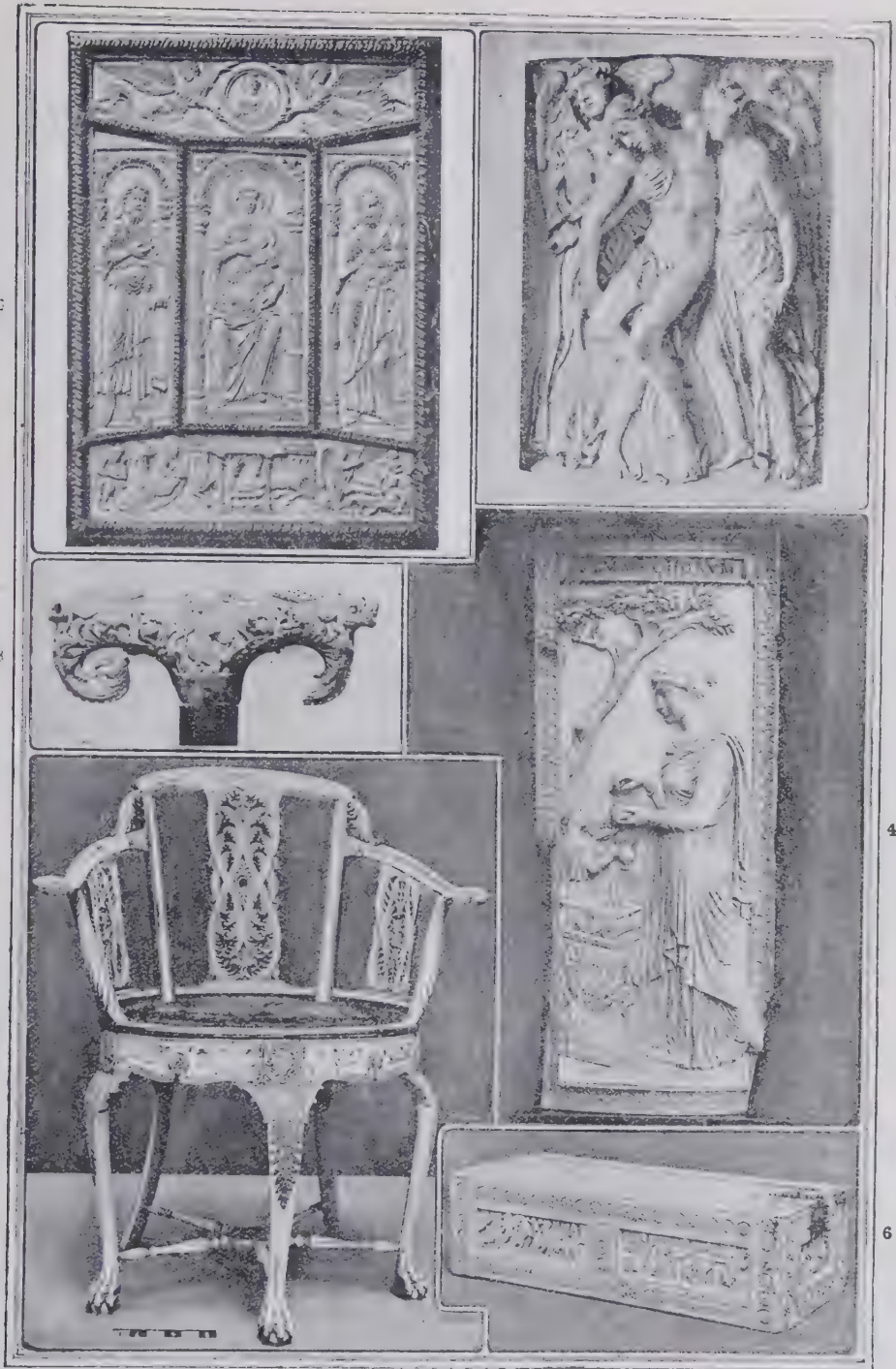
Ivory (vegetable).

1. Nut, outer shell partly broken; 2. kernel; 3. longitudinal section of kernel; 4. cross section, showing small cavity in centre.

ivory, serves but a limited purpose; and no substitute will take the peculiar polish of ivory. Vegetable ivory comes into commerce under the name of 'corozo nuts,' the hard, white, potato-sized seeds of a palm-like tree (*Phytelephas macrocarpa*) that grows in the low hot valleys of the Andes. The 'nuts' sell at about £10 per ton, and are used for buttons and small fancy articles of turnery.

Ivory, SIR JAMES (1765-1842), Scottish mathematician, was born at Dundee. Although managing partner of a flax mill near Forfar, he had a passion for mathematics. From 1805 to 1819 he was professor of mathematics in the Royal Military College at Marlow. 'Ivory's theorem' (read before the Royal Society in 1809) is a resolution of the problem of attractions of ellipsoids.

Ivory Coast, French colony on the W. coast of Africa, abutting on the Gulf of Guinea, between



Specimens of Carved Ivory.

1. Ivory book cover—Lorch Abbey book: Byzantine, 9th century (South Kensington Museum). 2. The dead Saviour supported by angels, by Valerio Vicentino: Italian, 16th century (British Museum). 3. Tau cross in horse ivory: English, 1020 (British Museum). 4. Part of diptych: Roman, 4th century (South Kensington Museum). 5. Chair of Tipu Sahib, from Seringapatam: Indian (South Kensington Museum). 6. The Veroli casket, wood covered with ivory: Byzantine, 11th century (South Kensington Museum).

the republic of Liberia and the British colony of the Gold Coast. It extends inland to about 10° N. lat., and rises from the low, flat coast to the plateau of the Kong territory (4,000 ft.). The interior, a table-land, is clad with almost impassable forest, interspersed with stretches of savanna. The chief products are maize, rice, coffee, palm oil and kernels, india-rubber, mahogany, ivory, and gold dust. Coffee promises well for the future. In 1904 the imports amounted to £737,323, and the exports to £435,608. Of the total trade, only about one-third is with France. The former capital was Grand Bassam, and the present capital is Bingerville (formerly Adjame). The coast was first settled in 1843, but the

m. w. of Paris; was the scene of the signal defeat of the Catholic Leaguers under the Duke of Mayenne by Henry IV. of Navarre (1590). Pop. (1901) 1,034.

Ivry-sur-Seine, tn., dep. Seine, France, on l. bk. of the Seine, S.E. of the fortifications of Paris; has manufactures of earthenware, glass, and chemicals, also steel works and breweries. Pop. (1901) 28,585.

Ivy (*Hedera*), a genus of climbing shrubs known and valued over a great part of the world. Among the ancient Greeks and Romans ivy held an honourable place; and it is one of three trees sung as the peculiar tree-adjuncts of the British home. The common ivy (*Hedera helix*), one of the most valuable of climbing plants,

flowers have much beauty and a great variety of colour.

Ixliorion, genus of half-hardy bulbous plants belonging to the order Amaryllidaceæ. They require a light, well-drained soil and a sunny situation. *I. kolpoukowskianum*, the most important species, bears in June and July large racemes of trumpet-shaped blue or white flowers.

Ixion, in ancient Greek legend, was a king of the Lapithæ, in Thessaly. He treacherously murdered his father-in-law, and as no mortal would purify him, Zeus took him to heaven and purified him there. For attempting the virtue of Hera he was bound in hell to an ever-rolling wheel.

Ixora, a genus of tropical evergreen shrubs belonging to the order Rubiaceæ. They are very beautiful plants, and most desirable occupants of stovehouses. They bear corymbs of showy salver-shaped flowers in summer. A light, peaty soil and plenty of water and heat are required.

Izabal. See LIVINGSTON.

Izard, the name of a local race of the chamols (*Rupicapra pragus*) which is confined to the Pyrenees. It is somewhat smaller than the Alpine form, and is of a more foxy-red colour, but the distinctions are not sufficiently marked to entitle it to rank as a separate species.

Izdubar, or GILGAMESH, a hero in Babylonian legend who, with his friend and ally, the demigod Ea-ban, killed Humbaba, the last Elamite usurper of the kingdom of Shumir, and later the monstrous bull sent against them by the revengeful goddess Ishtar, whose love Izdubar had repulsed. Ishtar then prevailed upon her mother Anatu to put Ea-ban to death, and to afflict Izdubar with a loathsome disease. Izdubar's lamentations induced the gods to allow Ea-ban to return again from the nether world, to comfort him and tell him what joys awaited him after death. See Sayce's *Hibbert Lectures* (1887); Ragozin's *The Story of Chaldeæ* (1886).

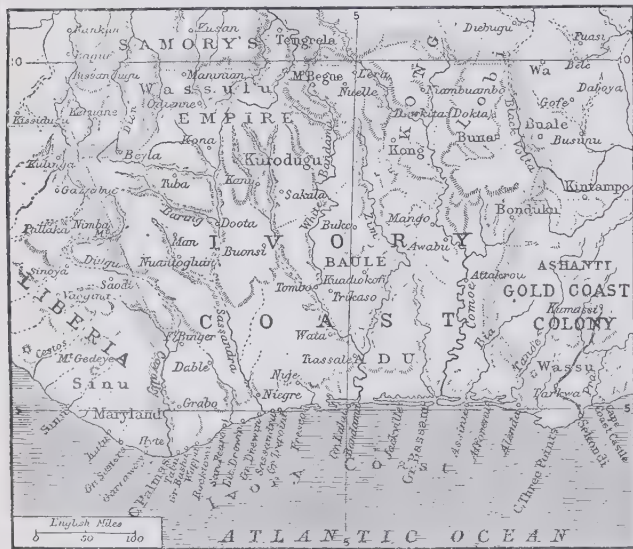
Izhevsk, or IJEVSK, tn., Vyatka gov., Russia, 40 m. N.W. of Sarapul, with an imperial arsenal and manufactory of weapons, iron foundry, etc. Pop. (1897) 21,500.

Izmail. See ISMAILIA.

Izucar. See MATAMOROS.

Izu-no-shichi-to, the seven islands of Izu, Japan, stretching some 100 m. S. of Tokyo Bay. The largest, Vries I., or Izu-no-Oshima, has an active volcano, Mihara (2,500 ft.). Formerly convict settlements.

Izyum, tn., Kharkov gov., Russia, 80 m. S.E. of Kharkov city, on the l. bk. of the Donets (Don basin). It contains an old citadel. Pop. (1897) 12,959.



The Ivory Coast.

hinterland was not effectively occupied until 1883, and the existing colony was established in 1899. Area about 200,000 sq. m.; pop. about 3,000,000.

Ivrea, tn. and episc. see, prov. Turin, Italy, 38 m. by rail N. by E. of Turin, on the l. bk. of the Dora Baltea. A Roman bridge crosses the river; other interesting structures are the castle, now a prison, and the oft-restored cathedral. Strategically important in Roman times for commanding the Great and Little St. Bernard Passes, the town was the capital of the margraviate of Ivrea established by Charlemagne. It has manufactures of silk, cotton, and iron goods. Pop. (1901) 11,696.

Ivry-la-Bataille, vil., dep. Eure, France, on the Eure, 42

belongs to the order Araliaceæ; its flowers are characterized by possessing a five-toothed calyx and a five-celled berry. The flowers are arranged in a sort of umbel. No flowers are produced until the plant has climbed to the summit of its support. Propagation is usually effected by means of cuttings. There are innumerable varieties, few of them equalling the wild species in beauty.

Ixelles, suburb of Brussels, Belgium. Pop. (1900) 58,615.

Ixia, a genus of South African bulbous plants belonging to the order Iridaceæ. They are usually grown as greenhouse plants, but in warm districts they can be grown in the open air in England. They like a light, well-drained soil and a sunny situation. The

J

J is simply a modification of I. It was employed for a time as the initial form of that letter. Since the 17th century the consonantal value of *i* has been assigned to *j*, and its vocalic value to the older form. The value of German *j* is the early consonantal value of *i*; it occurs also in the English word 'hallelujah.' The present English value is a compound of *d* and *zh*; it was borrowed from the French in the 14th century. The French value has now become *zh*, as in 'jour.' See I and G.

Jabalpur, or JUBBULPORE, cap. of Jabalpur dist., Central Provinces, India, near the Narbada, 165 m. N.E. of Nagpur; manufactures cottons and carpets. Formerly it was notorious as the haunt of the Thugs. Pop. (1901) 90,316. The district has an area of 3,918 sq. m., and a population (1901) of 2,061,000.

Jabbok, riv., E. Palestine, rises in Jebel Hauran, and flows in a winding course s.w. and w. into the Jordan, 30 m. N. of the Dead Sea. It is mentioned in Josh. 12:2 as the boundary between the kingdom of Sihon, king of the Amorites, and that of Og, king of Bashan. On its banks Jacob wrestled with his mysterious visitant (Gen. 32:22 ff.). Its modern name is Wady Zerka. Length, 110 m.



Jabiru.

Jabesh-Gilead, tn. of Gilead, Palestine, in Manasseh. Its inhabitants were put to the sword because they refused to help Israel against the Benjamites (Judg. 21). The city was delivered by Saul from the Ammonites, and Saul was buried near the city (1 Sam. 31:11-13).

Jabiru, a species of the genus *Mycteria*, which are storklike birds. The American jabiru, *M. americana*, is white, with black head, neck and bill, and feet. Both head and neck are devoid of feathers. In Australia and New Guinea occurs *M. australis*, whose plumage shows beautiful metallic tints. The head and neck are feathered, the bill black, and the long legs and the feet red. Other species occur in India and Africa.

Jabneel (Josh. 15:11, etc.), city of Judah, Palestine, s. of Joppa, on the sea-coast. As Jamnia it became famous as the seat of the Sanhedrin after 70 A.D., and for its school of rabbis, until the massacre of the Jews at Bether (near Jerusalem) by Hadrian in 135 A.D. Jabneel (Josh. 19:33) of Naphtali is a distinct site s.w. of the Sea of Galilee.

Jaborandi, a name given in pharmacy to the dried leaflets of *Pilocarpus pennatifolia* and other Brazilian species of this genus of shrubs, which belongs to the natural order Rutaceæ. The leaves are over a foot long; the oblong-lanceolate leaflets are arranged in pairs, each leaflet being from four to six inches long, obtuse, emarginate, smooth, and coriaceous. When bruised, the leaves and bark are slightly aromatic, and have a very bitter, pungent taste. Jaborandi contains tannic acid, a volatile oil, and the alkaloids pilocarpine, jaborine, pilocarpidine, and jaboridine. Applied to the eye, a solution of pilocarpine causes the pupil to contract. Internally it acts as a sialogogue and sudorific, in large doses acting as a powerful circulatory depressant. All its effects are arrested by atropine—the two alkaloids being thus mutual antidotes. So great is the sialogogic action of pilocarpine, that over a pint of saliva may sometimes be collected within half an hour of its administration.

Jaca, city and episc. see, prov. Huesca, Spain, a fortress (2,400 ft.) in Pyrenees, 48 m. from Huesca by rail. Pop. (1900) 4,934.

Jacamars are, brilliantly-coloured American birds, sometimes called large humming-birds. They belong to the sub-family Galbulinæ of the family Galbulidæ, and are allied to the barbets and honey-guides. The bill is long and straight, the feet weak, the flight quick and jerky. The ordinary colours are golden green above and brown or red below, but the beautiful *Urogalba paradisea* is dark blue. The food consists of insects.

Jacana, a name given to the members of the family *Pardidae*, widely distributed limicoline birds, remarkable for the great length of their toes, especially the posterior toe or hallux. All haunt lakes and swamps, and their long toes enable them to walk easily on the floating leaves of water lilies and similar plants.



Jacana.

An example is *Parra jacana* of S. America, with chestnut plumage marked with purple, greenish black, and yellow. The Indian jacana (*Hydrophasianus chirurgus*) has an enormously long tail, and is somewhat pheasant-like in appearance.

Jacaranda, a genus of American trees and shrubs belonging to the order Bignoniaceæ. Most of the species are natives of Brazil, and none are hardy in the climate of Britain. They are characterized by their terminal panicles of blue flowers, and more especially by their bipinnate leaves, which have great beauty. The best-known species is *J. ovalifolia*, or *J. mimosaefolia*, with its very beautiful foliage, each leaf having upwards of twenty pairs of pinnae, and each pinna about twenty pairs of fine-haired leaflets. Jacarandas may be cultivated in the stove-house in a mixture of fibrous loam, sand, and peat; thorough drainage is essential. They may be propagated by means of cuttings.

Jacaré, a native name applied to two species of caiman.

Jacinth. See HYACINTH.

Jackal. The common jackal (*Canis aureus*) of Asia generally and of N. Africa is an animal between two and two and a half feet long, with a bushy tail one-third of the length of the head and body. The jackal varies greatly in colour in the different parts of its extensive range, but is generally brownish, with a black

tip to the tail. It interbreeds freely with the pariah dogs of India, and differs from the wolves chiefly in the smaller size, shorter tail, and relative reduction of the carnassial or flesh teeth as compared with the molars. The diet is very varied, the flesh of animals which the jackals have themselves killed being mingled with carrion,



Jackal.

fruits, seeds, and sugar-cane, of which they are very fond. In addition to the usual blood-curdling cry, another call-note is uttered in the presence of a tiger or a leopard. In S. Africa the common jackal is replaced by two other related species, the striped jackal (*C. adustus*) and the black-backed jackal (*C. mesomelas*).

Jack-a-Lantern. See WILL-O'-THE-WISP.

Jackass, LAUGHING. See LAUGHING JACKASS.

Jackdaw (*Corvus monedula*), a bold and familiar member of the Corvidæ, found throughout England, Wales, and the south and east of Scotland. In parts of the extreme west of England and of Ireland its place is or was taken by the chough, and it is rare in the extreme north and west of Scotland. It is resident throughout most of Europe, but is rare and local in the extreme south, as it is also on the opposite shores of the Mediterranean.



Jackdaw.

Eastwards its range is limited by the Altai Mts., beyond which it is replaced by the related *C. dauvicius*, or Pallas's daw. From the crow and rook the jackdaw differs in its smaller size, less powerful bill, and in the gray collar; the rest of the plumage is black. The total length is about fourteen inches. The eggs

number from four to six. The food consists of worms, insects, the parasites of sheep, and at times also eggs. Colour-varieties are not uncommon, pure black, pied, and white birds being all known, while occasionally pure silver-gray specimens have been described.

Jackson. (1.) City, Michigan, U.S.A., co. seat of Jackson co., in the Lower Peninsula, in a coal region, 70 m. w. of Detroit. Its manufactures include foundry and machine-shop goods, carriages, wagons, agricultural implements, and fire bricks. Pop. (1900) 25,180. (2.) City, Tennessee, U.S.A., co. seat of Madison co., 80 m. N.E. of Memphis. It has a cotton trade, and grows fruit and vegetables. Here are the S.W. Baptist University and W. Tennessee College. Pop. (1900) 14,511. (3.) City, Mississippi, U.S.A., co. seat of Hinds co., and cap. of the state, on Pearl R., 45 m. E. of Vicksburg. It has a large trade, especially in cotton, and has some manufactures. Pop. (1900) 7,816.

Jackson, ANDREW (1767-1845), American soldier, and seventh president of the United States, born at Waxhaw Settlement, N. Carolina. When the state of Tennessee was formed, Jackson helped to frame its constitution, and became its representative in Congress. Appointed judge of the supreme court in 1798, he held the position until 1804. In 1813 he directed his energies against the Creek Indians in Alabama and Georgia. Entering the regular army (1814), he stormed Pensacola, then used as their base by the British. New Orleans being threatened by Sir E. Pakenham's force of 12,000 strong, its defence was Jackson's next essay, and on Jan. 8, 1815, he repulsed the British with a loss of 2,600, Sir Edward Pakenham being among the killed. In 1818 Jackson invaded Florida, where the Seminole Indians were in revolt. The rebellion was suppressed with great severity, and two British subjects, Robert Ambrister and Alexander Arbuthnot, were summarily executed, which led to some excitement in Britain. In 1821, after the purchase of Florida, Jackson was appointed first governor, but resigned the same year; and in 1823 he was elected to the United States Senate. He was a candidate for the presidency in 1825, and won the highest popular vote, but Adams was chosen. In 1828, however, he was elected president by a big majority, and was re-elected in 1832. See *Life* by Parton (1860) and by Sumner (new ed. 1900), and Bull's *History of Andrew Jackson* (1905).

Jackson, FREDERICK GEORGE (1860), English Arctic explorer, born at Denstone, in Staffordshire. After travelling in Australia, he crossed the tundras of Siberia in winter, and in 1894-7 led the Jackson-Harmsworth Polar expedition to Franz Josef Land, where he made many valuable scientific observations, and was instrumental in helping Nansen and Johannsen back to Norway. He has written *The Great Frozen Land* (1895), and *A Thousand Days in the Arctic* (1899).

Jackson, HELEN MARIA, known as 'H.H.' (1831-85), American novelist, born at Amherst, Massachusetts. Her best-known books are *A Century of Dishonour* (1881) and *Ramona* (1884). She had previously published *Mercy Philbrick's Choice* (1876), *Hetty's Strange History* (1877), *Bits of Travel* (1872), and *Bits of Talk about Home Matters* (1873), besides many stories for children. She denied the authorship of the books written under the pseudonym 'Saxe Holm,' which were attributed to her. She also wrote a number of good poems.

Jackson, PETER (1861-1900), pugilist, of negro extraction, born in the W. Indies. When suffering from a sprained ankle he fought J. J. Corbett (sixty-one rounds) and 'drew.' He beat Frank Slavin and many other first-class pugilists. Jackson's style was nearly faultless, and he had great physical power and almost unlimited endurance.

Jackson, THOMAS GRAHAM (1835), English architect, was born at Hampstead, near London. Articled to Sir Gilbert Scott, he learned from him a thorough mastery of the principles of Gothic architecture. He has restored many college and other buildings at Oxford and elsewhere, and has designed new buildings for public schools and churches. He has written *Modern Gothic Architecture* (1873); *Dalmatia, the Quarnero, and Istria* (1887); *Wadham College, Oxford* (1893); and *The Church of St. Mary the Virgin, Oxford* (1897).

Jackson, THOMAS JONATHAN (1824-63), American soldier, whose *nom de guerre* of 'Stonewall' was gained by his stubborn defence at the battle of Bull Run, was born at Clarksburg, W. Virginia. He first gained distinction in the war with Mexico (1846). In 1851 he joined the teaching staff of the Lexington Military Institute. On the outbreak of the civil war he was given command of the Virginian troops, and distinguished himself at the first battle of Bull Run, in the Shenandoah valley, and before Winchester. On Aug. 9, 1862, he defeated the Federals at Cedar Mountain; then won the second

battle of Bull Run; and on September 15, at Harper's Ferry, captured seventy cannon and 13,000 prisoners, and, later, gave substantial aid to Lee at Antietam. At Fredericksburg (December 13) he commanded the right wing. In 1863 he drove Hooker back upon the wilderness, surprised the right flank of the Federal army at Chancellorsville, but was accidentally shot by his own men after the pursuit. See G. F. Henderson's *Life of Stonewall Jackson* (1902); and *Life by Dabney* (1863), and by J. E. Cooke (1866).

Jacksonville. (1.) City, Florida, U.S.A., co. seat of Duval co., on the St. John's R., near its mouth. It ships lumber, phosphates, kaolin, cotton, and oranges. Jacksonville is a popular winter resort. In 1901 a disastrous fire did great damage. Pop. (1900) 28,429. (2.) City, Illinois, U.S.A., co. seat of Morgan co., 80 m. N. of St. Louis. It is primarily a residential town, and is the seat of the Illinois and other colleges. Pop. (1900) 15,078.

Jack the Ripper, the nickname of a homicidal maniac who, during 1888 and 1889, kept the Whitechapel district of London in a state of panic by a series of mysterious murders, all committed in the same fashion, his victims being women of the lowest class.

Jacmel, or **Jacquemel,** seapt., Haiti republic, on s. coast, 30 m. s.w. of Port-au-Prince. Vessels anchor half a mile from the shore. Pop. 8,000.

Jacob, the son of Isaac and grandson of Abraham. His life, picturesquely narrated in Genesis, is a strange blend of selfishness and duplicity on the one hand, and of heroism and spiritual aspiration on the other, as is indicated by his names, Jacob ('supplanter') and Israel ('prince' or 'perseverer with God'). Through his twelve sons he became the ancestor of the Israelite nation. He spent his last days in Egypt, where his son Joseph was prime minister; and on his death his remains were carried to Hebron and interred there. According to some writers —e.g. Ewald—Jacob's character and experiences are an idealized miniature of the qualities and history of the people that bear his name. See *Isaac and Jacob* (Men of the Bible, 1890) by Rawlinson; Ewald's *Hist. of Israel*, i.

Jacob, JOHN (1812-58), British general and writer on military subjects, was born at Woolavington, Somerset. In 1828 he entered the service of the East India Company, and served in Cutch (1834-40) and Sindh (1841-56). He commanded the cavalry in the Persian war of 1857, and died at Jacobabad, which had been renamed in his honour in 1851.

Jacob, SIR SAMUEL SWINTON (1841), English engineer, born in Bombay; served in the expedition against the Arabs under Sir W. Merewether. He was conspicuous for his efforts in dealing with the Rajputana famine (1868-9). His publications include *Jaipur Portfolios of Architectural Details* (1890), *Jaipur Enamels* (1896), etc.

Jacobabad, chief tn., Upper Sindh, India, 48 m. N.W. of Sukkur, named after General John Jacob. It is a cantonment and a municipal town. Pop. (1901) 10,787.

Jacobi, FRIEDRICH HEINRICH (1743-1819), a younger contemporary of Kant, and himself a philosopher, was born at Düsseldorf. Here he held intercourse with a wide circle of literary friends, among whom were Lessing, Herder, and Goethe. In the later period of his life he was for some years president of the Academy of Sciences at Munich, where he died. He did much to direct attention to the true importance and significance of Spinoza, and also distinguished himself by acute criticism of Kant. He represents an important tendency in the thought of the period—viz. that which recognized faith rather than demonstrative science as ultimate, and insisted on the limits of the knowledge attainable by the latter. A philosophy which takes scientific demonstration for its ideal must end, according to Jacobi, either in the materialism of Spinoza or in the subjective idealism of Fichte. Scientific knowledge, he agrees with Kant, is limited to the sphere of the finite, of phenomena. It is by faith not by logical proof that we pass beyond the circle of phenomena to an outer reality, whether it be the reality of the external world or the higher divine reality which is revealed to us by an inner or spiritual intuition. But Jacobi did not give to this position any systematic development, and his 'faith' itself remains a rather ambiguous conception. His *Werke* were published in 6 vols. (1812-24). See Zöppritz, *Aus F. H. Jacobi's Nachlass* (1869).

Jacobi, KARL GUSTAV JACOB (1804-51), German mathematician, born at Potsdam, of Jewish descent; was professor of mathematics at Königsberg, but ill-health compelled him to retire (1842). He discovered elliptic functions, on which he wrote a treatise; and was one of the originators of the 'theory of determinants.' His chief work was *Fundamenta Nova Theoriae Functionum Ellipticarum* (1829). His *Gesammelte Werke* (7 vols.) were published in 1881-91. See his *Life* by Königsberger (1904).

Jacobi, MORITZ HERMANN VON (1801-74), German physicist, brother of K. G. Jacobi, born at Potsdam; went to St. Petersburg (1837), and in 1839 communicated to the Academy of Sciences of that city his discovery of the process of electrolysis, or *galvanoplastik*, as he termed it. Others, however, have claimed the credit of the discovery.

Jacobins, a party that appeared in France during the revolution. At first fairly moderate in tone, and including all deputies opposed to the government, after 1791 it became more extreme and decidedly revolutionary. During the years 1792-94 it was one of the most important influences in France, influencing opinion by means of daughter clubs in every considerable town and village throughout France. Camille Desmoulins, Marat, Danton, Pétion, and all the revolutionary leaders, were at one time members, but the dominant influence was that of Robespierre. On his fall the club was closed (1794).

Jacobites, the name applied after the revolution of 1688 to the adherents of the Stuarts, more particularly to those who rose in 1715 and 1745, or openly sympathized with them then or later. For some years the activity of the supporters of James II. was confined to futile plots, such as the Assassination Plot of 1696, for which some prominent Jacobites suffered. In 1715 occurred the simultaneous rebellions in Scotland and in the north of England. The indecisive battle of Sheriffmuir proved the end of the Scottish affair, and the English rebels surrendered at Preston. James, the 'Old Pretender,' who had succeeded to his father's pretensions, arrived when all was over, and was soon shipped back to France. Derwentwater and Kenmore among the nobles, and a host of minor folks, were executed, and many of the surrendered prisoners were sent to the plantations in America. It is the rebellion of 1745, with the charming personality of the 'Young Pretender,' 'Bonnie Prince Charlie,' that has touched the heart of romance. The enterprise was really hopeless from the first, but many circumstances seemed to favour it. At first fortune smiled on Charles and his Highlanders, and Prestonpans seemed the earnest of still greater victories. But the turning at Derby showed the Stuart incapacity for seizing an opportunity, and, despite many gallant and romantic episodes, the remainder even of Prince Charlie's life was frivolous and inept. The vengeance taken by the English government was

limited by the prudence of Forbes of Culloeden, and the power of the Highland chiefs was broken by the abolition of heritable jurisdictions, and by the era of prosperity which set in as soon as the Highland menace was removed. See Hill Burton's *Hist. of Scotland* (8 vols. 1873); Chambers's *Hist. of the Rebellion of 1745* (new ed. 1869); and Andrew Lang's *Pickle the Spy* (1897).

A number of Jacobite societies have been formed to promote the spread of 'legitimist' principles. Among these are the Legitimist Jacobite League of Great Britain and Ireland, with which is incorporated the Society of the Red Carnation; the Order of St. Germain; and the Order of the White Rose. These claim the throne of Great Britain for Mary Theresa Henrietta Dorothea, Princess Louis of Bavaria, whom they style Mary III. and II., as the lineal descendant of Mary Stuart. See *The Legitimist Calendar* (1899).

Jacobs, JOSEPH (1854), author, was born at Sydney, N.S.W. He lectured in the United States in 1896. He has written copiously, but not exclusively, on Jewish subjects; has edited *Folklore, The Literary Year Book, and The Jewish Year Book*, and now edits the *Jewish Cyclopaedia*; and has translated Spanish and Italian works. Among his works are *English Fairy Tales* (3rd ed. 1898); *Studies in Jewish Statistics* (1891); *Celtic Fairy Tales* (1891 and 1894); *Indian Fairy Tales* (1892); *Studies in Bible Archaeology* (1894); *The Jews in Spain* (1894); and *Jewish Ideals* (1896).

Jacobs, WILLIAM WYMARK (1833), humorous writer, born in London, entered the savings-bank department of the post office (1833), from which he retired in 1899, contributing to *Pick-Me-Up* and other journals. By a single stroke his volume *Many Cargoes* (1896) gave him his reputation. He is one of the few writers who succeed in being deliberately humorous. In addition to *Many Cargoes*, he has written *The Skipper's Wooing* and *The Brown Man's Servant* (1897), *Sea-Urchins* (1898), *A Master of Craft* (1900), *Light Freights* (1901), *At Sunnich Port* (1902), *The Lady of the Barge* (1902); dramatized, 1904, *Odd Craft* (1904), *Dialstone Lane* (1904), and *Captains All* (1905).

Jacobsdal, div. of Orange River Colony, British S. Africa; also a town, 24 m. s. of Kimberley, with about 1,000 white inhabitants. The Modder River passes through it, flowing westward. Jacobsdal figured in the engagements culminating in the relief of Kimberley by Lord Roberts in 1900.

Jacobsen, JENS PETER (1847-85), Danish novelist, born at Thisted in Jutland; won fame especially after the publication of *Fru Marie Grubbe* (1876), a masterly delineation of 17th century life in Denmark. His last romance, *Niels Lyhne* (1880; Eng. trans. as *Siren Voices*, 1896), is disagreeably pessimistic in tone, but a very brilliant piece of work. Jacobsen indeed, despite a tendency to preciosity, undoubtedly is a consummate stylist. He also wrote poems, *Digte og Udkast* (1886), and translated Darwin's *Origin of Species* (1893).

Jacob's Ladder (*Polemonium coeruleum*), occasionally found wild in Britain, though whether as an escape or as a native is doubtful. It is an erect plant, about eighteen inches high, with pinnate leaves, and bears in summer terminal pale blue flowers, with wheel-shaped corollas. It is easily grown in ordinary garden soil, and may readily be propagated by root division. There is a white-flowered variety, and also a variety with variegated foliage. Most of the species of *Polemonium* are natives of N. America.

Jacobus (Latin equivalent for James), a gold piece which obtained its name from being introduced into the British coinage by James I. It was of the value of twenty-five shillings sterling.

Jacopone da Todi (c. 1240-1306), Italian religious poet; entered the Franciscan order, and wrote religious poems that breathe the most passionate asceticism. He is important chiefly as an author of *laude*, which, in their dialogue form, play a leading part in the development of the Italian drama. In some of his pieces Jacopone inveighed against Boniface VIII., and he took sides against the pope in his struggle with the Colonnas. When Penestrina, the stronghold of the latter, fell (1298), he was thrown into a dungeon, where he languished for five years, till the death of Boniface (1303). Several beautiful Latin hymns (among them the *Stabat Mater*) have been attributed to Jacopone. See especially D'Ancona's *J. da Todi*, reprinted from the *Nuova Antologia* in the *Studi sulla lett. ital. de' primi secoli* (1884). The first edition of Jacopone's works appeared at Florence in 1490, and a useful selection was edited by Sorio (1858). For a full bibliography see Gaspary's *Early Ital. Lit.* (Eng. version, 1901).

Jacotot, JEAN JOSEPH (1770-1840), French educationist, was born at Dijon, and became professor of the humanities at the college there, being afterwards mathematical professor. Compelled to leave France in 1815, he became professor of French

at Louvain, where he applied his method of education, known as 'universal instruction,' which bears some resemblance to Hamilton's. His chief works are *Enseignement Universel* (1824; 7th ed. 1852). See Tourrier's *Intellectual Emancipation, a Treatise on Jacotot's Method of Universal Instruction* (1852).

Jacquard, JOSEPH MARIE (1752-1834), French mechanician, born at Lyons; did much to improve the lot of the French artisan. He invented the Jacquard loom, a system of horizontal and perpendicular bars, springs, and hooks, which can be adjusted to any kind of loom, obviating the tedious guidance by hand. This revolutionized the art of weaving.

Jacquerie, a revolt of French peasants in May and June 1358. The name arose from the contemptuous term 'Jacques Bon-homme' by which the nobles designated the peasants. The insurrection had its source in the increased burdens laid upon the peasantry by the seigneurs after the battle of Poitiers, and came to a head in the neighbourhood of Paris, from whence it spread outwards. The nobles, headed by Charles of Navarre, utterly defeated the peasant army near Meaux.

Jacquinia, a genus of W. Indian and tropical American evergreen shrubs and trees belonging to the order Myrsinaceæ. The leaves are crowded at the top of the branches, and are rigid and entire. The flowers have bell or salver-shaped corollas, and are white or orange in colour. The best known species are *J. armillaris*, the so-called W. Indian bracelet-wood, its brown and yellowish seeds being made into bracelets; and *J. aurantiaca*, with beautiful racemes of small orange flowers.

Jactitation of Marriage is when one party boasts or gives out that he or she is married to another, whereby a common reputation of this marriage may ensue. The divorce courts under the Matrimonial Causes Act, 1857, sec. 6, can now, on the suit of the other party, decree perpetual silence against the jactitator; but the following are good defences to the action—(1) denial of the boasting; (2) proof of the marriage; (3) acquiescence either past or present in the representation.

Jade. See JADEITE.

Jade, or JAHDE (Ger. *Jade-busen*), bay in N.W. of Germany, a few miles W. of the estuary of the Weser. It is 75 sq. m. in area, and on its W. side Prussia has constructed since 1855 her North Sea naval port of Wilhelmshafen.

Jadeite, formerly confounded with nephrite, a distinct mineral, is a member of the pyroxene group, which occurs in compact masses of thin felted fibres, very tough, hard, and taking a fine polish. It contains sodium, and is easily fusible, which distinguishes it from the infusible nephrite. White, pale-green, apple-green, and emerald-green varieties are known, and it is often clouded or flaked, and is then valued as an ornamental stone. It is found in China, Burma, and many parts of Southern Asia, never in Europe, though prehistoric ornaments of jadeite have been obtained in some of the pile dwellings of Switzerland. In Mexico and China it was in great favour.

Jael, the wife of Heber the Kenite, who slew Sisera, after his defeat by Barak and Deborah, by driving an iron tent-peg through his temples while he was asleep (Judges 4).

Jaen. (1.) Province, Southern Spain, on the s. slopes of Sierra Morena and the plains N. of Granada. It is well watered by the rivers Guadalquivir, Segura, etc., and is one of the most fertile districts in Spain, producing oil, wine, and cereals. Lead-mining is active, especially in Linares, La Carolina, Bailen, etc. Area, 5,203 sq. m. Pop. (1900) 474,490. (2.) Capital of above prov., formerly the cap. of a short-lived Moorish kingdom. It stands on the slope of Mount Castillo. The Moorish ruins, and the cathedral (1525), on the site of a mosque, containing St. Veronica's handkerchief with the holy face, are specially interesting, and there are some weaving and milling industries. Pop. (1900) 26,424.

Jafarabad, feudatory state in Kathiawar, Gujarat, Bombay, India. Estimated area, 42 sq. m. Jafarabad, the chief town, 24 m. E.N.E. of Diu, is about a mile from the sea. Pop. (1901) 6,038.

Jaiffa (anc. *Joppa*), seapt. of the Syrian coast, 54 m. by rail N.W. of Jerusalem. It is only an open roadstead. The chief exports are oranges, olive oil, sesame, wool, and barley. Pop. 23,000. It is called Japho in Joshua (19:46), and traded with Tyre and Tarshish (2 Chron. 2:16; Jonah 1:3; Ezra 3:7; Acts 9:42). It is noticed on monuments 1600-1300 B.C., and was attacked by Sennacherib in 702 B.C. It was sacked by the Arabs in 1722, and by Napoleon in 1799.

Jaffna, or JAFFNAPATAM, tn. on an isl. of same name off N. coast of Ceylon. The Tamil inhabitants chiefly cultivate, on irrigated land, Palmyra palms, tobacco, and curry stuffs. There are a Portuguese fort, temples, and an old Dutch church. Pop. (1900) 33,879.

Jaffnapatam. See JAFFNA.

Jagadhri, munic. tn., Ambala dist., Punjab, India, 35 m. E.S.E. of Ambala. Manufactures copper and iron ware. Pop. (1901) 13,462.

Jagannath, SHANKERSETT (1800-65), Hindu patriot, born at Bombay; made a large fortune in business. He promoted the establishment of schools and libraries, overcoming native prejudices against these institutions. He also helped to rebuild some of the older parts of Bombay, and to make roads and railways.

Jagellones, a royal dynasty of Poland, descended from Gedimin, grand-duke of Lithuania, in the early part of the 14th century. Grand-duke Jagello ascended the Polish throne by marriage in 1386. His descendants held it down to 1572, when the male line became extinct.

Jägerndorf, tn., Austrian Silesia, 18 m. by rail N.W. of Troppau; manufactures cloth, organs, machinery, etc., and possesses a pilgrimage church (Burgberg) and a castle of the Prince of Liechtenstein. Pop. (1900) 14,675.

Jägersfontein, tn. in Fauresmith div., Orange R. Colony, British S. Africa, 70 m. W.S.W. of Bloemfontein; near it are the Klipfontein diamond mines.

Jaggernaut. See PURI.

Leicestershire. He lived mainly at Snitterfield, where he died. His poems, the taste and poetical feeling of which were highly thought of by his friends Shensstone and Somerville, were published in collected form in 1784.



Jaguar.

Jaguar (*Felis onca*), the largest of the New World cats. It slightly exceeds the Old World leopard in size, and possesses a similar type of coloration—i.e. spots of black on a light ground; but while the leopard's spots are either pure black or consist of an incomplete ring of black surrounding a light spot, the jaguar bears large black rings, including one or more black spots on a light ground. The head is also larger than in the leopard. In disposition the jaguar is ferocious and bloodthirsty; it climbs



The Port of Jaffa.

Jaggery is a sugar obtained from the flowering shoots of two Indian palms, *Phoenix sylvestris* and *Caryota urens*. But many other palms, notably *Nipa fruticans*, *Arenga saccharifera*, and the date palm, *Phoenix dactylifera*, also yield jaggery juice. This saccharine juice is largely fermented, and the fermented liquid distilled, a form of arrack being the product.

Jago, RICHARD (1715-81), English poet, held three Warwickshire livings from 1746 to 1771. In the latter year he resigned two of them, retaining the vicarage of Snitterfield, on his appointment to the rectory of Kimcote,

well and takes readily to the water, but, though larger, is less agile than its ally the puma. There is much antagonism between puma and jaguar where the two inhabit the same district, but it appears that the latter has no chance against its more nimble foe. The jaguar occurs from Texas to Patagonia. It seems to feed largely on the capybara, but modifies its habits in accordance with the special peculiarities of its surroundings. Thus in well-watered regions it sometimes feeds chiefly on fish, turtles, and alligators; in dense forests it becomes arboreal, and feeds on monkeys; while at times it emu-

lates the puma in its attacks on cattle and horses. From two to four cubs are produced at a birth. The name tiger is often erroneously applied in America to the jaguar, just as the puma is called lion, panther, or 'painter.'

Jahde. See JADE.

Jahn, FRIEDRICH LUDWIG (1778-1852), father of German gymnastics (*Turnwater*), born at Lanz, near Wittenberge; served in the Prussian army, and in 1811 established a gymnastic school near Berlin. Jahn was imprisoned for six years as a demagogue, but was released in 1825. See *Life*, in German, by Pröhle (1881).

Jahn, JOHANN (1750-1816), Austrian (Roman Catholic) orientalist and archaeologist, was born at Tasswitz in Moravia, and became professor first at Olmütz, next (1789) at Vienna. In his views of Biblical literature he was before his time, and he eventually exchanged his professorship for a canonry at Vienna (1806). His principal works are *Einleitung in die göttliche Bibel des Alten Bundes* (1793); *Biblische Archäologie* (1805-25; trans. by Upham); *Biblica Hebraica* (1806); *Enchiridion Hermeneutice Generalis* (1812).

Jahn, OTTO (1813-69), German archaeologist and philologist, born at Kiel. His *Die Hellenische Kunst* (1846) and *Peitho* (1846) are held to be of first importance; *Persius* (1843) and *Censorinus* (1845) have high value. Among his publications there is a masterly biography of Mozart (1856-60). Lecturer at Kiel in 1839, he accepted the chair of archaeology at Leipzig (1849), and founded the Archaeological Society there. Deprived of his professorship owing to his political opinions in the movement of 1848-9, he resumed professorial work (1855) when appointed professor of the science of antiquity and director of the Academic Art Museum at Bonn. See Springer's *Gedächtnisrede auf Otto Jahn* (1869).

Jahvist, or J, a term applied to the writer or school from whom came those portions of the Hexateuch characterized by the use of the name Jahveh—i.e. Jehovah. The term Jehovist, or JE, is properly restricted to the author (or school) who combined the Jahvist's work with that of the Elohist (E), and has been adopted as such in virtue of its combining the consonants of Jahveh with the vowels of Elohim. See HEXATEUCH.

Jail Fever. See TYPHUS FEVER.

Jainism is the faith of a religious community in India, which owes its origin to Vardhamāna Mahāvira (c. 550-480 B.C.). He was born in a suburb of Vesālī,

the capital of Videha, the ruins of which lie, still unexplored, at Besarh in Tirhut, about twenty-five miles from Patna. His father was one of the chiefs of the Vajjian clan, who then occupied that district as a free aristocratic republic. Just at that time a wave of intellectual movement was passing over N. India (similar to the movements at the same period in China and in Greece). There was a leap forward in speculative thought, a revolt in ethics, a tendency towards a religion of conscience, to take the place of the older and still persisting faith in sacrifice and magic. One of the new ideas was to substitute for the sacrifice of animals to the gods the habit of self-sacrifice. Vardhamāna joined an order of ascetics whose main principles were non-injury (*ahimsā*)—that is, of any living thing—and bodily self-sacrifice and self-torture (*tapas*). They believed in the existence of souls inside all living things, including men and the most minute vermin; in plants, and rivers, and mountains; in the sun, and moon, and stars; and even in drops of cold water. All these doctrines they carried to the utmost extreme in conduct. The members of the order went naked, refrained from disturbing vermin, obtained food by begging, and strove in every way to suppress the body—so far, indeed, that it was considered a great merit to die by self-inflicted starvation. The Jains have often been confounded with the Buddhists. This, however, is quite wrong. The latter did not believe in souls at all; they were celibate, but not ascetic; their doctrine of kindness to animals was not so extreme; and their doctrine of self-mastery was mental rather than bodily. The two orders have been, throughout the history of India, the exponents of two divergent views of life and conduct. Of the early history of the Jains very little is known as yet. They have documents going back to the 3rd century B.C., but only a few fragments have been published in Europe. From the 3rd to the 8th century they seem to have been numerous and powerful; but they suffered persecution at the hands of the Brahmans, and are now a small community. Their numbers at the census of 1901 were given as 1,334,150. Many of the most beautiful of the mediæval buildings in India were built by the Jains, and their temples on Mount Abu and Mount Parasnath are famous. The members of their order are often learned, and the laity are wealthy and highly respected. See Jacobi's *Jaina Sutras*, vols. i. and ii. (1884

and 1895); Weber in *Indische Studien*, vols. xvi. and xvii.; Hoernle's *Uvāsaga Dasao*, text and translation (1888-90); Leumann in the *Journal of the German Oriental Society*, vol. xlv. i.; Bhandarkar in the *Report on Sanskrit MSS. for 1883-4* (1886).

Jaintia Hills, subdiv. of Khasi and Jaintia dist., Assam, India; lies to the s. of the Brahmaputra valley, and covers an area of about 2,000 sq. m. Coal and limestone are the chief minerals, and rice is grown. The inhabitants, who call themselves Panars, have a monosyllabic language differing from that of the Khasis, by whom they are called Syntengs.

Jaipur, or JEYPORE. (1.) Feudatory state in Rajputana, India; has an area of 15,349 sq. m. The surface is generally level, though broken by a spur of the Aravalli Mts. in the N.W. Copper, cobalt, and iron are found, and salt is prepared. Gold enamelled work is the chief industry. Jaipur is one of the wealthiest and best administered states under native rule. Pop. (1901) 2,658,666. (2.) Capital of above state, lies 84 m. N.W. of Ajmere. This modern town has been well planned, and is one of the most striking of Oriental cities. The principal buildings are the maharajah's palace, a college, and a school of art. Muslins, cloths, and jewellery are the chief manufactures. The picturesque ruins of Amber, the ancient capital, are 5 m. distant. Pop. (1901) 160,169.

Jaisalmir, cap. of a feudatory state of same name, Rajputana, India; was founded in 1156 by Rawal Jaisal. It has numerous Jain temples and a strong fort. Pop. (1901) 7,137.

Jaice, anc. tn., Bosnia, in the valley of the Vrbas, 100 m. by rail N.W. of Sarajevo. It is commanded by a fortress, anciently the palace of the Bosnian (Serbian) kings. Pop. about 5,000.

Jakobshavn, a station of N. Greenland, on a narrow bay, off Disco Gulf, in 69° 15' N.

Jakutsk. See YAKUTSK.

Jalalabad, or JELALABAD, tn. near the Kabul R., Afghanistan, near the Khyber Pass, midway between Kabul and Peshawar. It was the scene of a magnificent defence against the Afghans for five months, in 1841-2, by a British force under Sir Robert Sale. Pop. about 3,000.

Jalapur. (1.) Town, Punjab, India; 75 m. N.W. of Lahore; noted for its shawls. Pop. (1901) 10,640. (2.) Ruined city in Jhelum dist., Punjab, India, 70 m. S.E. of Rawal Pindi; is identified with the site of the ancient Bucephala, built by Alexander the Great in memory of his famous charger.



Views in Jaipur.

1. The Palace, Amber. 2. Temple of the Winds. 3. The Museum. 4. Street scene.

Jalandhar, or **JULLUNDUR**, munic. city, cantonment, and cap. of Jalandhar dist., Punjab, India, 47 m. E.S.E. of Amritsar; is referred to in the *Mahābhārata*. The district has an area of 1,332 sq. m.

Jalap is a drug consisting of the dried tubercles of *Ipomoea purga*. It increases the flow of bile, but has a still more powerful effect on the intestinal glands. The tubercles contain about ten per cent. of jalap resin, the active principle of the drug. Jalap may be administered in the form of powder or in alcoholic solution, and it is extremely useful in many conditions, such as dropsy and cardiac engorgement, in which copious watery evacuations are desirable, but it must never be given when the alimentary canal is inflamed or irritable. As an anthelmintic, it is used in the form of compound scammony powder, of which it is one of the ingredients.

Jalapa, or **HALAPA**. (1.) Town, Vera Cruz state, Mexico, 56 m. N.W. of Vera Cruz, in the midst of gardens, and containing a handsome cathedral. The medicinal plant jalap, from which the town derives its name, grows wild in the district. Pop. (1900) 18,168. (2.) Department, Guatemala, Central America, bounded on the N. by Rio Grande; produces rice, coffee, maize, and sugar cane. Its capital is Jalapa. Area, 1,150 sq. m. Pop. 34,000.

Jalaun, tn., Jalaun dist., United Provinces, India, 68 m. S.W. of Cawnpur; was once the capital of a native dynasty. Pop. (1901) 8,573. The district has an area of 1,430 sq. m., and a population (1901) of 399,726.

Jalisco, state of Mexico, bounded on the W. by the Pacific Ocean. The N. is drained by the Rio Grande de Santiago, which flows out of Lake Chapala. The state rises in terraces from the coast to the Sierra Madre, with its volcanic cones, the highest of which are Colima (12,750 ft.) and Nevado, now extinct (14,100 ft.). Gold and silver are mined. Cotton and woollen goods, tobacco, and paper are manufactured. The area is 31,846 sq. m., and the population (1900) 1,137,311. Cap. Guadalajara.

Jalna, tn. and cantonment, Haidarabad, India, 38 m. E. of Aurangabad; with celebrated fruit gardens. Pop. (1901) 20,270.

Jalpaiguri, tn., cap. of Jalpaiguri dist., Bengal, India, 50 m. S.E. of Darjiling. Pop. (1901) 9,708.

Jam. Jams and fruit jellies consist respectively of the whole substance of fruits, or of their fluid portions only, preserved in a solution of sugar. The quantity of sugar used for one part by

weight of clean fruit varies from one part in the case of harsh, highly acid fruits like red currants to a half part in the case of cherries or blackberries. The process of boiling serves to dissolve the sugar in the juices that flow from the fruit, to sterilize the whole mixture, and to cause the juice to develop the all-necessary setting properties, which are due to the presence of the little known 'pectin bodies' always to be found in ripe fruits. The time requisite for boiling may be anything from ten minutes to one or even two hours, according to the kind of fruit. On the other hand, if the boiling be continued too long, the setting powers of the jam may be destroyed again, owing to the conversion of the pectin into pentoses. In all cases where steam heating is not available, the process is carried out over a slow fire, so as to keep up the temperature without unduly driving off steam, which invariably carries away with it the aromatic and flavouring principles of the fruit. Commercial jams are boiled for a shorter period than those prepared domestically. They contain, therefore, a smaller proportion of inverted sugar. For this reason home-made jam is superior from a dietetic point of view. The actual proportion of cane-sugar in most home-made jams averages twenty per cent.; in commercial jams, from ten to fifty per cent. In the preparation of jellies, the fruit is warmed, and bruised if necessary, to cause the juice to flow out, and the solid portions are then removed from the mass by straining. The juice alone is subsequently boiled with sugar until ready to 'jelly.' *Marmalade* is a kind of jam made from oranges, lemons, and similar thick-skinned fruits. Much aromatic flavouring matter is contained in the peel of these fruits; so that in making the preserve, in order to avoid loss of flavour by volatilization with the steam, at least part of the peel is kept separate from the pulp (which is freed from the pips, etc., and boiled as usual with sugar), and is added in the form of shreds only towards the end of the boiling process.

Jamaica. (1.) The largest British island in the W. Indies, 90 m. S. of Cuba. From the E. end the Blue Mountains run about one-third of the length (144 m.) of the island, and culminate in Blue Mountain Peak (7,423 ft.). The rest of the surface is an arched plateau, rising to more than 3,000 ft. (Mount Diablo, 3,053 ft.). As a rule the climate is moderate for a tropical country, and in the higher parts very agreeable. The low S. coast-lands are hot,

the average mean at Kingston being over 79° F. The mean rainfall is about 70 in., but varies considerably. The cayman lives in the Black R., and the manatee and W. Indian seal are found off the coast. The island is well wooded; the flora is rich and varied, and includes orchids and other flowers. On the S. coast are acacias and cactuses. The population consists principally of negroes and half-breeds. The whites form only a small proportion of the people. A few Indian coolies have been introduced. The cultivation of sugar, once the great industry of the island, has declined, but it has recently been stimulated by the Sugar Convention. Fruit cultivation, on the other hand, is expanding, and cocoa-nuts, bananas, oranges, etc., are shipped in increasing quantities. Pimento is obtained almost exclusively from Jamaica, and logwood is shipped from the Black R. Ginger, coffee, and tobacco are also grown. The chief ports are Kingston (the capital), Port Antonio, and Montego. Port Royal, at the mouth of Kingston harbour, is a naval station. The values of the exports and imports in 1903 were £1,543,267 and £2,014,447 respectively. Discovered by Columbus (1494), and settled by the Spaniards in 1509, Jamaica was taken by the English in 1655. The emancipation of the slaves in 1833 resulted in the almost total ruin of the Jamaican plantations. The emancipation was followed by negro risings, which were put down by Governor Eyre, in the words of a commission appointed to investigate his conduct, 'with commendable firmness.' Representative government was restored in 1884. Under the same government are the Turks and Caicos Is. in the Bahamas, the Cayman Is. (pop. 4,322), whence turtles and cocoa-nuts are exported, and the Morant and Pedro cays. Area, 4,207 sq. m. Pop. (1902) estimated at 770,242. (2.) One of the five boroughs of New York City, U.S.A., on Long I.

Jamalpur, tn. and munic., Bengal, India, 32 m. W. by N. of Bhagalpur. The workshops of the East India Railway Company are situated here. Pop. (1901) 17,965.

Jambu-dvipa, one of the seven divisions of the world, according to Hindu cosmogony; so called from the jambu tree. It is disputed whether the term is applicable to all Asia, or to parts of the interior only. The golden mountain Meru, the situation of which is also disputed, was the centre of Jambu-dvipa. In Indian geography the term is applied to the mountain region N.W. of India.

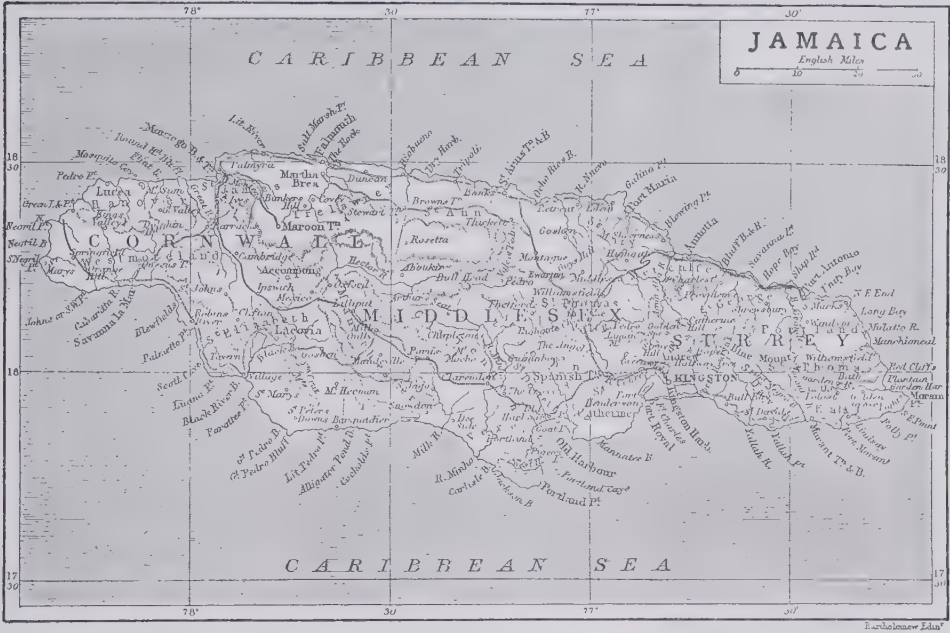
Jambusar, munic. tn. in Broach dist., Bombay, India, 28 m. N.W. of Broach. Pop. (1901) 10,181.

James. (1.) River, U.S.A. (See DAKOTA.) (2.) River, U.S.A., rises in the Alleghany front in W. Virginia, and flows generally E. to its mouth at the foot of Chesapeake Bay. It is tidal and navigable to Richmond, 150 m. above its mouth. Length, 400 m.; drainage basin, including the Appomattox, 9,684 sq. m.

James Bay, the southern extremity of Hudson Bay, N. America. Its length is about 280 m., and its average breadth 150 m. See HUDSON BAY.

the patron saint of Spain—St. Iago or Santiago. (2.) **JAMES, THE SON OF ALPHEUS**, and of Mary, also one of the twelve, is sometimes called James the Little (Mark 15:40; A.V. 'the Less,' wrongly), an attribute understood as referring either to his stature or to his age (cf. Deissmann's *Bible Studies*, p. 144 f.). (3.) **JAMES, THE BROTHER OF THE LORD**, or James the Just, was not a disciple, and at first not even a believer. After the resurrection (1 Cor. 15:7) he joined the Christian community, and soon became head of it (cf. Gal. 1:18 f.; Acts 15:4 f., 21:18). According to Josephus (*Ant.* xx.

does not manifest a systematic structure, and its general style contrasts strikingly with Paul's, being more akin to that of the Book of Proverbs, or even the sermon on the mount; it likewise shows resemblances to the epistles of Clement and Hermas; of doctrine in the proper sense it contains nothing, and the name of Christ is mentioned but twice. The author regards the law with the highest veneration and affection; for him it is no yoke or burden grievous to be borne, but rather the royal law (2:8) and the law of liberty (2:12). In one passage (2:14-26) the epistle seems to conflict with Paul's doctrine of



James. At least three different persons in the New Testament bear this name. (1.) **JAMES, THE SON OF ZEBEDEE**, a disciple of Jesus, the brother of John, sometimes called James the Great. James and John were fishermen on the Lake of Galilee, partners with Simon Peter and Andrew, and were probably the cousins of Jesus. Along with Peter they form what may be called the inner circle of the disciples (see Mark 5:37 f., 9:2 f., 14:33 f.; cf. 13:3 f.). They were surnamed Boanerges, or 'Sons of Thunder,' by Jesus, probably from their impetuosity (Mark 3:17; cf. 10:37). James was the first martyr among the apostles, being put to death by Herod Agrippa, c. 44 A.D. (Acts 12:1 f.). He is

9, 1) he was martyred at the instance of the high priest Ananias the Younger, c. 62 A.D. Later writers speak of him as a Nazirite, and distinguish him as 'the Just.' See PROTEVANGELIUM and next article. **JAMES, THE EPISTLE OF**, the first in order of the Catholic Epistles of the New Testament. The writer calls himself 'James, a servant of God and of the Lord Jesus Christ' (1:1), and the work is addressed to the Christian Jews of the dispersion, its design being to encourage them in the midst of trials, and to warn them against various doctrinal and practical errors—e.g. invidious respect of persons, belief without good deeds, sins of the tongue, etc. The epistle

justification through faith alone (cf. Rom. 3:28) in asserting that good works are necessary to salvation. It was this quality of 'legalism' which led Luther to speak of the booklet as an 'epistle of straw,' and in point of fact a few later critics—e.g. Spitta—still regard it as a work of Jewish origin, with but the slenderest disguise of a Christian form. But a less capricious criticism than Luther's has been able to demonstrate that there is no essential antagonism between the views of Paul and James; the faith which the latter condemns is mere external belief, and far removed from the burning passion which alone ranks as faith with the former. Spitta's view, again, is well met by the traditional

hypothesis that the author of the work was James, the brother of the Lord, who is otherwise known to have been zealous for the law, who was called 'the Just,' and who might be expected to insist more upon the essence of Christ's (his brother's) teaching than his personality. The dates given by Von Soden (reign of Domitian), Pfeleiderer (later half of 2nd century), and Spitta (pre-Christian) may be left to cancel each other, and their very diversity seems to remove any insurmountable objection to the traditional date. See commentaries by Plumptre (1878, *Camb. Bible*), Von Soden (*Hand-Commentar zum N.T.*, 3rd ed. 1899), Dale (1895), Plummer (*Expositor's Bible*, 1891), J. B. Mayor (1897).

James I. (1406-37), king of Scotland, was the son of Robert III., and was born at Dunfermline in 1394. In 1406 James was captured by the English while sailing to France to be educated. He remained a prisoner in England till 1424, when he returned to Scotland. He crushed the house of Albany (1425), and forced Alexander, the Lord of the Isles, to submit (1429). While he was endeavouring to strengthen the crown and give his kingdom internal peace, war broke out with England. A defeat of an English force at Piperden, near Berwick, in 1436, was followed by an attempt on the part of an English fleet to capture the Princess Margaret when on her way to France to marry the Dauphin, afterwards Louis XI. James then endeavoured, but failed, to capture Roxburgh. On Feb. 20, 1437, he was murdered at Perth, the chief conspirators being the Earl of Athole and Sir Robert Graham. Though rapacious, and often imprudent, James aimed at the welfare of his people. He made and enforced good laws, took a keen interest in religion, and was especially active in carrying out social reforms. *The Kingis Quair* is the most famous of his poetical writings. See J. T. T. Brown's *The Authorship of the Kingis Quair* (1896).

James II. (1437-60), king of Scotland, was only in his seventh year when he succeeded his father, James I. A truce of nine years was made with England, dating from July 1, 1438. During the next few years Sir Alexander Livingstone and Sir William Crichton at one time contended for the possession of the young king, at another time acted together against all rivals. In 1439 a coalition was formed between Douglas and Livingstone against Crichton, who was overthrown in 1445, though he shortly afterwards regained the king's favour.

Douglas further distinguished himself by attacking and defeating the Percies. After executing Livingstone (1450), James, in February 1452, murdered Douglas with his own hand, on discovering his confederacy with Crawford and Ross. James, the ninth Earl of Douglas, continuing the struggle, was defeated at Arkinholm in 1455. In 1460 the king led a force to besiege Roxburgh Castle, but on August 3 was killed by the explosion of a cannon. Important legislative enactments mark his reign, and the administration of justice was made more efficient by the establishment, in 1458, of a court or committee of nine representatives of the clergy, nobility, and burghers to deal with judicial matters. Glasgow University was founded by him in 1451.

James III. (1460-88), king of Scotland, was the son of James II. Till 1466 the government was carried on by guardians. Of these the Earl of Angus died in 1462, and Bishop Kennedy of St. Andrews in 1465. James III. patronized the fine arts, and a vigorous national literature was developed. Robert Henryson, the poet, was to Scotland what Chaucer was to England. Till 1483, however, James was occupied in making himself the real master of his kingdom. From 1465 the family of the Boyds held the reins of power until 1469, when the king shook them off. In 1479 troubles arose in connection with James's two brothers, the Duke of Albany and the Earl of Mar. Both were imprisoned, but while Mar died in confinement, Albany escaped to France. In 1480, owing to the intrigues of Louis XI., hostilities between England and Scotland recommenced, and Edward IV. was assisted by Albany; but the death of Edward IV. in 1483 freed James from the danger of further English invasions. But his weak government provoked a rising of the nobles, which led to his defeat at Sauchieburn, near Bannockburn, and his murder while fleeing from the defeat.

James IV. (1488-1513), king of Scotland, born in 1473, was the son of James III. Possessed of many accomplishments, James had an enterprising nature and an inquiring mind. But he was restless, extravagant, and headstrong. At first the insurgent lords conducted the government, and acted with energy and decision. As soon as he began to govern, James placed implicit confidence in Sir Andrew Wood of Largo, who showed great skill in the development of the navy. The years 1493 and 1494 were occupied in securing the submission of John, Lord of the Isles. But no sooner had James's

triumph been assured than difficulties arose with England. In 1495 James received Perkin Warbeck; and though he invaded England, a truce was concluded between the two countries on Sept. 30, 1496. In 1503 Henry VII.'s daughter Margaret married the Scottish king. In 1511 the relations between James and Henry VIII. became strained. The capture of two Scottish ships by Sir Edmund Howard was a further cause of irritation. In 1513, when Henry was engaged on his campaign in France, James invaded England, but was defeated and killed at the battle of Flodden (Sept. 9, 1513).

James V. (1513-42), king of Scotland, the son of James IV., was born at Linlithgow in 1512, and it was not till 1528 that he began to govern. For many years after Flodden the rival English and French parties struggled for supremacy in Scotland. In 1528 James escaped from the custody of the Earl of Angus, overthrew the influence of the Douglases, and made peace with England for five years. He adopted vigorous measures with regard to the Border chieftains, and established some sort of order in the Highlands and islands. But from 1532 the king's real troubles began. The antagonism between him and Henry VIII., the hostility of the nobles, the opposition of the reformers, were in evidence during the later years of the reign. It only required the outbreak of war between England and France in 1542 to bring about hostilities between England and Scotland. The rout of a Scottish force at Solway Moss in 1542 so overwhelmed James with shame and grief that he died in December of the same year, leaving a daughter only seven weeks old, afterwards Mary Queen of Scots.

James I. OF ENGLAND (1603-25) AND **VI. OF SCOTLAND** (1567-1625), son of Mary Queen of Scots and Darnley, and grandson of James V., was born in Edinburgh Castle in 1566. Till 1581 he was under the guidance of regents, of whom Moray and Morton were the most important. His rule in Scotland was much disturbed by political and religious discontents. In 1582 the raid of Ruthven took place. James was captured by some discontented nobles, who forced him to banish Lennox and imprison Arran, his two favourites. Though the confederate lords in the following year were compelled to fly to England, they returned in 1585 and insisted upon the banishment of Arran, who had been reinstated. Till 1603 James had difficulties with the Presbyterians and Roman Catholics. He wished to introduce Episcopacy, and

in 1600 bishops were established in Scotland; this was the year, too, of the Gowrie conspiracy. On the death of Queen Elizabeth in 1603, James became king of England and Ireland. His view that he held the kingship by divine right, his impression that Puritanism was the same as Presbyterianism, his wish to tolerate the Roman Catholics, and his determination to exercise absolute power over Parliament, led to conflicts with the House of Commons which continued throughout his reign. Till 1612 he was guided in foreign politics by Robert Cecil, who, however, was unable to bring about peace between James and his first Parliament, which sat from 1604 to 1611. Over the rights of the Commons, over the question of the union of England and Scotland, and over religious matters, disputes arose; and though a Parliament met in 1614, it only sat for a few months. It was not till 1621 that James called his third Parliament. 'The wisest fool in Christendom,' James had been taught by George Buchanan, and was well versed in religious knowledge and in foreign politics. His desire for toleration of Roman Catholics was checked by the Gunpowder Plot (1605), his hopes of a close union between England and Scotland by the narrow views of the English Parliament. From 1612 to 1618 he made strenuous efforts to bring about a marriage between the Infanta of Spain and Prince Charles, hoping thereby to secure the peace of Europe. He had already, by his Ulster settlement, begun in 1607, attempted to give peace to Ireland. But the native Irish disliked the settlement, and were not conciliated; and in 1618, the year in which Raleigh was executed, the Thirty Years' war broke out, and all hopes of the Spanish match were destroyed. Hoping by diplomacy to secure the restoration of Frederick to the palatinate, James sent Prince Charles and the Duke of Buckingham to Spain. The mission having failed, James made a treaty with Denmark, and arranged a marriage alliance with France. War with Spain was popular in England, and the Parliament of 1624 was favourable to the king's policy. James's attachment to favourites, such as Robert Carr and Buckingham, was unfortunate. James wrote *Basilikon Doron* (1599) and one or two other books.

James II. (1685-8), king of Great Britain and Ireland, was born in London in 1633, the second son of Charles I. and Henrietta Maria; he was created Duke of York. During the civil

war he remained in England till shortly before his father's execution, when he fled to France. Between 1649 and 1660 he saw warfare under Turenne and in the service of Spain. At the restoration in 1660 he was made lord high admiral of England, and won the battles of Solebay (1665) and Southwold Bay (1672) in the Dutch wars. In 1672 he openly professed Roman Catholicism. Owing to the Test Act passed in 1673, he was obliged to resign his post of lord high admiral. The excitement over the popish plot necessitated his retirement from England. In 1679 the Exclusion Bill, to prevent the accession of James, was brought forward. The same year James returned, and was sent to suppress the Covenanters in Scotland, which he did with much cruelty. At the close of 1680 the Exclusion Bill was thrown out by the Lords; and after a stormy period a reaction in favour of royalty set in, which continued till the death of Charles II. in 1685. Having overcome the rising of Monmouth, James endeavoured to secure the repeal of the Test Act by means of Parliament. On the failure of his attempt, he fell back on the dispensing power, set up a new Court of Ecclesiastical Commission, and issued his first Declaration of Indulgence. In April 1688 James issued his second Declaration of Indulgence. Seven bishops petitioned against the king's illegal command, and were tried. Their acquittal was followed by an invitation to William of Orange to come over to England. His landing was followed by James's flight to France. One of his daughters, Mary, married the Prince of Orange. Another succeeded to the English throne as Queen Anne. His son by his second wife, James Francis Edward, is known as the Old Pretender. At first Louis XIV. gave James considerable help, and the ex-king endeavoured to use Ireland as a stepping-stone to the conquest of England. His defeat at the battle of the Boyne (1690), however, destroyed his chance of success, and he returned to France.

James, DAVID (1839-93), English actor (whose real name was Belasco), was born in London, and first appeared on the stage at the Princess's Theatre, subsequently playing in burlesques at the Royalty and the Strand, and in 1870 joined Thorne and Montague in managing the Vaudeville Theatre, where James's 'Mr. Jenkins' in the *Two Roses* and 'Perkyn Middlewick' in *Our Boys* were very successful.

James, FRANCIS EDWARD STUART. See STUART.

James, GEORGE PAYNE RAINSFORD (1801-60), English novelist, born in London. Widely popular in their time, his works are of no artistic merit, though accuracy of historic background and clearness of style are among their best points. They include *Richelieu* (1829), *Darnley* (1830), *De l'Orme* (1830), *Henry Masterton* (1832), *Attila* (1837), *Henry Smeaton* (1851), and *Ticonderoga* (1854). A historical student, he also published *Memoirs of Great Commanders* (1832), *Life of the Black Prince* (1836), *A History of Chivalry* (1843), and lives of sovereigns, English and French; also pamphlets on current politics. In 1839 he became historiographer royal to William IV. He was British consul at Massachusetts (1850-2), at Richmond, Virginia, U.S.A. (1852-6), and at Venice (1856-60), where he died. See preface by James to collected edition of novels (1844-9).

James, GEORGE WHARTON (1858), English author and explorer, born at Gainsborough in Lincolnshire. For ten years he explored the Grand Cañon of the Colorado R., and has embodied the results in his *In and Around the Grand Cañon* (1900). He has also written *Missions and Mission Indians of California*, *Indian Basketry* (1901), and *The Indians of the Painted Desert Region* (1903).

James, SIR HENRY (1803-77), director of the Ordnance Survey of England and Wales, was born at Rose-in-Vale, Cornwall, and succeeded Colonel Hall (1854) as director-general of the Ordnance Survey. The art of photozincography was introduced by James (1859). He is the author of *Photozincography* (1860).

James, HENRY (1843), American novelist, brother of William James, psychologist. From 1871 onwards he has produced a series of novels, dealing mainly with American life, which have gained the attention of the more cultured classes both in England and in the United States. For they exhibit an insight into the finer shades of character and motive which is very subtle, and a wonderful atmosphere. He is an artist in the depicting of certain sides of modern life, but his art is a mixture of pre-Raphaelitism and impressionism. He can draw in few lines. And the types of which he writes—leisured, complex, often given to self-analysis, and above all modern—have found nowhere else a delineator so skilful. Among his later works, *Embarrassments* (1896) is a collection of sketches, which are sometimes as tantalizing as they are absorbing. *The Awkward Age* (1899) deals with the rise of bohemianism in Lon-

don in the closing years of the 19th century. Other works are *Watch and Ward* (1878); *Roderick Hudson* (1875); *A Passionate Pilgrim* (1875); *Daisy Miller* (1878); *Life of Hawthorne* (1879); *The Portrait of a Lady* (1881); *The Bostonians* (1886); *The Tragic Muse* (1890); *What Maisie Knew* (1897); *The Sacred Fount* (1901); *The Wings of a Dove* (1902); *The Ambassadors* (1903); *The Better Sort* (1903); and *English Hours* (1905).

JAMES, WILLIAM (d. 1827), naval historian, was in early life an attorney in Jamaica, and in 1812 was detained as a prisoner of war in the United States, but managed to escape. He turned his attention to naval subjects, and wrote *Naval Hist. of Great Britain from 1793-1820* (1822-4), an accurate and valuable work.

JAMES, WILLIAM (1842), American psychologist, brother of Henry James, novelist; in 1881 became professor of philosophy at Harvard. His writings are marked by a freshness of expression and illustration and a charm of style which go far to make them popular. In psychology, especially in analytic psychology, he has done valuable work, and some theories advanced by him—e.g. that of 'fringes'—have aroused general attention among psychologists. In philosophy an idealist, his work in this direction, though it lacks none of his characteristic charm, represents a series of somewhat detached inquiries, from which no very definite system of thought can be deduced. To the setting forth of such a system it must, however, be said that he lays no claim whatever, his essays being rather of the nature of *obiter dicta*. Among his works are *Principles of Psychology* (1890); *The Will to Believe, and other Essays in Popular Philosophy* (1897); *Human Immortality* (3rd ed. 1899); *Talks to Teachers on Psychology, and to Students on some of Life's Ideals* (1899); and *Varieties of Religious Experience* (1902), being the Gifford Lectures (1901-2). He edited *The Literary Remains of Henry James* (1885).

JAMES OF HEREFORD, HENRY JAMES, FIRST BARON (1828), English lawyer, was called to the bar in 1852, and took silk in 1869—the year in which Taunton elected him as its Liberal representative. In 1873 Gladstone made him solicitor-general. In November 1873 he was promoted to attorney-general, and held office till the defeat of the government in 1874. On the return of Gladstone to power he was again principal law officer to the crown (1880-5), and, in that capacity, framed and carried through Parliament the Corrupt Practices

Act, 1883. In him Gladstone found one of the most formidable opponents to his Home Rule policy, not only in 1886, but in 1893. He refused to take office in the Marquis of Salisbury's second administration (1886-92), but did so in the Unionist government of 1895-1900, filling the position of Chancellor of the Duchy of Lancaster, with a seat in the cabinet. He retained the office on the reconstruction of the ministry in 1900, but on the formation of Mr. Arthur Balfour's first government (1902) he retired owing to ill-health. He was raised to the peerage in 1895. With Sir Richard Webster (now Lord Alverstone) he was leading counsel for the *Times* newspaper in the Parnell Commission (1889), and from 1892-5 acted as attorney-general to the Prince of Wales. In the boot strike of 1895 and the North-eastern Railway strike of 1897 he was chosen arbitrator at the suggestion of the workmen. As member for Bury (1885-95) he actively interested himself in cotton factory legislation. He was a member of the court of appeal which adjudicated in the case of the Free and United Free Churches of Scotland in 1904, and gave his decision in favour of the claims of the Free Church.

JAMESON, ANNA BROWNELL (1794-1860), Irish authoress, born at Dublin. She lived chiefly apart from her husband, and wrote historical and literary studies—chief among the latter being *Characteristics of Women* (1832)—and studies of mediæval art and legends: her series of *Sacred and Legendary Art* (1848-52) was an important introduction to a subject then little studied. Among her other works are *Sisters of Charity* (1855); *The Communion of Labour* (1856); *Memoirs of Celebrated Female Sovereigns* (1831); *Companion to the public picture galleries of London* (1842), and *Companion to the private galleries* (1844); *Legends of the Monastic Orders* (1850); *Legends of the Madonna* (1852); and *A Commonplace Book* (1854). The last of the series on *Sacred and Legendary Art* (first part issued in 1848) was completed by Lady Eastlake, and bore the title *The History of Our Lord* (1864). An edition of Mrs. Jameson's works appeared in 1890. See *Memoirs* by Mrs. Macpherson (1878), and *Biographical Sketches* (1869) by Harriet Martineau.

JAMESON, LEANDER STARR (1853), South African politician, was born in Edinburgh, and was associated with Cecil Rhodes in most of his enterprises, particularly in Rhodesia. He was frequently engaged, both offensively

and defensively, against the Matabele, until they submitted in 1894. Jameson was appointed administrator of Rhodesia for the British South African Company in 1891, and he held this position until the events connected with the raid led to his supersession in January 1896. He crossed the company's frontier and entered Transvaal territory on Dec. 29, 1895, was defeated by the Boers at Krugersdorp on Jan. 1, 1896, and again at Vlakfontein on Jan. 2, when he and his force surrendered conditionally. At the request of the British government, Jameson and his officers were handed over by the Transvaal government to Sir Hercules Robinson, and sent to England to take their trial for offences under the Foreign Enlistment Act. Jameson was found guilty, and sentenced to fifteen months' imprisonment without hard labour. That was in May, but, owing to ill-health, he was released from jail on December 2. In 1900 he was returned to the Cape Legislative Assembly as member for Kimberley, and, on the death of Cecil Rhodes in 1901, was elected leader of the Progressive party in Cape Colony, and in 1904 became premier.

JAMESONE, GEORGE (?1588-1644), Scottish portrait painter, a native of Aberdeen. His popularity in Scotland was wide, and among his sitters were the Marquis of Montrose, the Marquis of Argyll, and James VI. and Charles I. In 1633 he went to Italy with his patron, Sir Colin Campbell of Glenorchy, for whom he produced a number of works, now at Taymouth Castle and Langton House, Duns, Berwickshire. See J. M. Bulloch's *George Jamesone* (1885).

James's Fever Powder consists of one part of antimonious oxide and two parts of phosphate of calcium. It is chiefly used in five-grain doses in such febrile and inflammatory cases as are relieved by sweating.

Jamestown. (1.) Capital and Admiralty coaling station, St. Helena, on the N.W. coast. It stands in a deep, narrow valley. The observatory is the principal building. The governor of the island resides at Jamestown. In the neighbourhood is the first burial-place of Napoleon. (See also ST. HELENA.) Pop. about 2,500. (2.) City of Chautauqua co., New York, U.S.A., situated at the foot of Chautauqua Lake, 60 m. S.S.W. of Buffalo. It is a popular summer resort. Pop. (1900) 22,892. (3.) District, James City co., Virginia, U.S.A., at mouth of James R., 45 m. N.W. of Norfolk; the first permanent settlement by the English in

what is now the United States (1607). It was (1619) the meeting-place of the first legislative assembly in the New World. (4.) Town, Lydenburg div., Transvaal Colony, British S. Africa, 15 m. N. of Barberton, in the Kaap gold fields district.

Jami, NUREDDIN ABDURRAHMAN (1414-92), Persian poet, was born at Jam (Khorassan). His best-known poems are *Yusuf and Salikha* (Eng. trans. 1889), *Mejnan and Lella* (Ger. trans. 1890), and *Salaman and Absal* (Eng. trans. 1879). Jami also wrote a history of the Sufis, and other prose works. His collected works appeared in 1890.

Jamieson, JOHN (1759-1838), Scottish philologist and antiquary, was born in Glasgow; joined the Anti-Burgher section of the Secession Church, being minister first at Forfar (1781-97), and next at Edinburgh (1797-1830). His principal work is *The Etymological Dictionary of the Scottish Language* (1808), with two supplementary volumes in 1825; a revised edition (1879-87). Jamieson also edited Barbour's *Bruce* and Blind Harry's *Wallace*, both in 1820. In theology he published his *Reply to Priestley* (1795).

Jamkhandi, chief tn. of the feudatory state of the same name, in the s. Maratha country, Bombay, India, 37 m. s.w. of Bijapur. Pop. (1901) 13,029. The state has an area of 555 sq. m., and a population of over 100,000.

Jammu, or JAMU, tn., cap. of feudatory state of Jammu, Kashmir, India, 80 m. N. of Amritsar. It is the residence of the maharajah of Kashmir. Pop. (1901) 36,130.

Jamnотri, hot springs in Garhwal state, United Provs., India, near the source of the Jumna. Alt. 10,849 ft.

Jamrud, fort in Peshawar dist., Punjab, India, at the mouth of the Khyber Pass. It is an outpost of considerable importance on the British frontier.

Jamsetjee Jeejeebhoy (1783-1859), Parsi philanthropist, was born in Bombay, and became a very successful China merchant. His large-hearted generosity and his princely benefactions to hospitals, schools, and other public works earned for him a baronetcy. He was the first native of India to be so honoured.

Jamshid, the subject of much Persian poetry and tradition, is supposed to have reigned in Persopolis about 1000-800 B.C., and to have been dethroned by Zohak, an Arabian.

Janesville, city, Wisconsin, U.S.A., co. seat of Rock co., on Rock R., 60 m. s.w. of Milwaukee. It has trade in tobacco, and manufactures of machinery, cotton

and woollen goods, boots and shoes. Pop. (1900) 13,185.

Janet, PAUL (1823-99), French philosopher, born at Paris; became professor of philosophy in Strassburg University (1848), and in 1864 at the Sorbonne in Paris. He was the chief exponent of the idealistic school in France during the second half of the 19th century, and wrote with great lucidity. His principal books are *La Famille* (1855; 13th ed. 1890); *Hist. de la Science Politique* (3rd ed. 1887); *Le Matérialisme contemporain* (Eng. trans. 1865); *Les Causes Finales* (Eng. trans. 2nd ed. 1883); *La Morale* (Eng. trans. 1884); *Principes de Méta-physique et de Psychologie* (1897); and, with Séailles, *Histoire de la Philosophie* (Eng. trans. 1902).

Jang, BAHADUR (1816-77), chief minister of Nepal, India. His uncle was assassinated in 1845 by his rivals, who met with the same fate in 1846, when Jang became sole minister of Nepal, and held office until his death. He was loyal to the British government during the mutiny, and assisted Sir Colin Campbell in suppressing the rebellion in Oudh.

Janiculum, THE, a hill on the r. or N. bk. of the Tiber, opposite to the city of Rome. It was not included within the fortifications until the time of Aurelian (c. 275 A.D.).

Janin, JULES GABRIEL (1804-74), novelist and critic, born at St. Etienne (Loire); was theatrical critic of the *Journal des Débats* from 1836 till his death. He also wrote novels, books of travel, essays, and historical treatises—the principal being *Hist. de la Litt. Dramatique* (1853-8); *L'Ané Mort et la Femme Guiltoline* (1827; new ed. 1860), a parody of a romantic novel; and *La Religieuse de Toulouse* (1850). He was chosen member of the French Academy in 1870. His *Œuvres Diverses* were published in 12 vols. in 1876-8.

Janina, or YANINA, tn. of Albania, European Turkey, on lake of same name, 80 m. W. of Larissa. The ancient buildings and the fortifications are now in ruins. The chief products are gold ware and silk goods. It is the seat of a Greek archbishop. From 1788 to 1818 it was the stronghold of Ali Pasha, the tyrant of Epirus. Pop. 20,000, of whom 12,000 are Christians and 3,000 Jews.

Janluay, tn., Iloilo prov., Panay, Philippines. Silk and cotton are manufactured. Pop. (1898) 28,740.

Janizaries, a body of Turkish troops created in 1328 out of prisoners of war of the Osmanli Turks, and thereafter recruited by seizing Christian boys, training them up as adherents of Is-

lam, and organizing them as a privileged body of soldiers. Their numbers generally amounted to 40,000 men. Occasionally they tried to rule the sultans—they actually deposed Selim III. in 1807. They were suppressed by Mahmud II. in 1826.

Jan Mayen Island, in Greenland Sea (71° N.), 300 m. E. of Greenland; about 16 m. long by 4 m. wide; is entirely volcanic, uninhabitable, and usually surrounded by ice. Probably sighted by Hudson in 1607, it was rediscovered by Jan Mayen in 1611.

Jannes and Jambres, the traditional names of the magicians who 'withstood Moses' (Exod. 7: 11 f.; 2 Tim. 3: 8). The Targum of Jonathan represents them as being sons of Balaam, while Origen believed that Paul's reference was to an apocryphal work *Jannes and Mambres*. See Schürer's *Geschichte des Jüdischen Volkes* (1886-90).

Jansenism, a religious movement in France which takes its name from Cornelius Jansen (1585-1638), who was born at Acquoi, near Leerdam, in Holland, and became professor of theology at Louvain (1617) and bishop of Ypres (1635). He left a posthumous work, *Augustinus* (1640), dealing with the writings of St. Augustine. Certain statements therein being regarded as heretical, a controversy broke out between their supporters and opponents. A genuine religious movement, Jansenism attracted to itself many who regarded it chiefly as a weapon against the Jesuits, and the French monarchy which supported them. Pascal's *Provincial Letters* were written to defend the Jansenists. The distinguishing features of Jansenism were:—(1) The doctrine of grace was upheld against the Jesuit doctrine of works; (2) a more rigid and puritanic morality was insisted on; (3) the authority of the Bible and the early councils was upheld as against the later developments of the church; (4) great and successful attention was paid to education. The community of Port Royal, near Versailles, with its nuns and solitaries, was the centre of the movement. The chief landmarks in the history of Jansenism are the following:—In 1652 a papal formulary was procured condemning five theses in the *Augustinus*, and all Catholics were required to accept this formula. This was republished in 1661, and the nuns of Port Royal had to submit to much persecution because they refused to sign it. In 1705 a papal bull (*Vineam Domini*) repeated the demand for acceptance of the formulary, and as a result Port Royal was closed, the buildings destroyed, and the

graveyard ploughed up. The controversy, however, broke out again in 1713, on Jansenist opinions being discovered in a book by Quesnel called *Moral Reflections on the New Testament*; and a bull (the *Unigenitus*) condemned one hundred and one statements in this book. The struggle was continued in Louis xv.'s reign; but the movement had lost its former earnestness, and became chiefly an excuse for opposition to the government. The Parliament of Paris was a strong supporter of Jansenism. See Sainte-Beuve's *Port Royal* (6th ed. 1901), Fuzet's *Les Jansénistes du XVII^e Siècle* (1894) and *Port-Royal*.

Jansenville, div. and vil., Cape Colony, Brit. S. Africa. Area, about 1,500 sq. m. The village is on the Sundarg R., 90 m. N.W. of Port Elizabeth. Pop. of div. (1904) 11,326.

Janson, KRISTOFER NAGEL (1841), Norwegian author, born at Bergen, was for many years director of the high school in Gudbrandsdal. Nearly all his works are written in the *Maal*, and are mostly realistic sketches of peasant life—*viz.* *Fraa Bygdom* (1865); *Han og ho* (1868); *Marit Skjölte* (1868); *Torgim* (1872). He has also written a volume of poems, *Norske Dikt* (1866); a historical tragedy, *Jon Arason* (1867); and a celebrated collection of fairy tales, *Austanfjyre Sol og vestanfjyre Maane* (1879).

Janssen, CORNELIUS (1590-1665), Dutch painter, native of Amsterdam; went to England about 1618, where he executed work for James I. and Charles I. The civil war, however, drove him back to Holland, where he remained until his death. He was chiefly a portrait painter, his work being of considerable merit.

Janssen, PETER (1844), German historical painter, born at Düsseldorf; studied under Karl Sohn and Bendemann. He holds a foremost place among modern historical painters in Germany. His most important work, *Walther Dodge and the Peasants of Berg before the Battle of Worringen*, 1288, was awarded the great gold medal in Berlin (1893).

Janssen, PIERRE JULES CÉSAR (1824), French astronomer, was born at Paris. He travelled to Peru in 1857, and to the Azores in 1867, for the purpose of correcting magnetic observations; observed the total solar eclipse of Aug. 18, 1868, at Guntur in India, and initiated next morning the spectroscopic method of viewing prominences in daylight. Escaping from Paris in a balloon on the approach of the total eclipse of Dec. 22, 1870, he reached Oran only to be baffled by clouds. His next journey was

to Nagasaki in Japan, to observe the transit of Venus on Dec. 8, 1874. In 1875, on his return from a third eclipse expedition to Siam, he was appointed director of the new astrophysical observatory at Meudon, and there devoted consummate skill to the art of solar photography. In the course of a comparative investigation of telluric oxygen absorption and the solar spectrum, he made ascents of Mont Blanc in 1888, 1890, and 1893, and erected an observatory on the summit. The results obtained were negative as regards the presence of oxygen in the sun.

Janssens, VICTOR HONORIUS (1664-1739), Belgian painter, a native of Brussels, studied at Rome, where he executed many historical works. The fruits of subsequent years of work at Brussels are still to be seen in various parts of the Netherlands. From 1718-21 Janssens resided as court painter at Vienna.

Janssens van Nuyssen, ABRAHAM (?1575-1632), Dutch painter, born at Antwerp, in 1601 entered the Guild of St. Luke as a 'master.' A precursor of Rubens, until the rise of the latter he was the greatest historical painter of the time. Among his pictures the *Burial of Christ* and the *Adoration of the Magi* are pre-eminent. These are at Antwerp. Other works are *Day and Night*, now at Vienna, and paintings of classical subjects at Berlin.

Januarius, ST. (d. 305 A.D.), martyr, suffered death at Pozzuoli, near Naples. He was bishop of Benevento during the reign of Diocletian, and after being put to death under circumstances of peculiar atrocity and inhumanity was canonized. His body is preserved in the cathedral at Naples, and on certain days every year his blood, preserved in two phials, is believed to undergo liquefaction.

January. See YEAR.

Janus and **Jana**, two ancient Latin divinities, male and female, who were worshipped as the sun and moon. Janus was the god at Rome who presided over the beginning of everything; hence he was always invoked first, even before Jupiter; so, too, the first month was called after him. He was also the guardian deity of gates, and was commonly represented with two faces. In particular, the door of his so-called temple at Rome, really a covered passage near the Forum, stood open in time of war, while in time of peace it was closed.

Jaora, a Mohammedan feudatory state on the N.W. angle of Malwa, Central India, has an area of 581 sq. m. Its chief product is opium. Pop. (1891) 117,650. Jaora, the capital, is 20 m. N. of Ratlam. Pop. (1901) 23,854.

Japan, called by its inhabitants Nihon or Nippon—*i.e.* 'sun-origin' or 'eastern land'—consists of a long chain of islands extending from 51° to 22° N. lat., the total length being about 2,400 m. Beginning from the N., it comprises the volcanic Chishima or the Kuriles, which approach close to Kamchatka; the southern half of Sakhalin (s. of 50° N.), restored to Japan by the treaty of Portsmouth, U.S.A. (1905); Yezo or Hokkaido (includes also the Kuriles), separated by a narrow strait from Sakhalin; Japan proper, including Hondo or Honshu, Shikoku, and Kyushu, the latter separated by the Strait of Korea from the continent of Asia; the Luchu Islands; and Formosa, divided from China by the Formosa Channel. The Bonin Islands, a very small group, far to the s. of Honshu, also belong to Japan. The coast-lines are much indented. There are numerous deep bays and many excellent harbours. Japan is a very mountainous country, the only considerable plain being that of Tokyo. Honshu is traversed from end to end by much broken ranges with numerous branches. In the N.E. the highest summits are mostly volcanic cones superimposed on older mountains, such as Ganju-san (7,400 ft.) and Chokai-san (7,100 ft.). Iide-san, farther to the s., and not volcanic, has an altitude of 6,100 ft. Near it is Bandai-san (6,500 ft.), a volcano, whose eruption, or rather explosion, in 1888 caused great loss of life. The Nikko district has several volcanoes, of which Shirane-yama (7,500 ft.) and Nantai (8,100 ft.) are the principal. Asamayama (*san* or *yama* means 'mountain'), an active volcano (8,100 ft.), occupies the centre of the axial range of Honshu. West of it extend the highlands of Shinano, and beyond is a majestic range of non-volcanic granitic mountains, 8,000 to 10,000 ft. in height, with lofty detached volcanoes on its western margin. South of Asamayama is the famous Fuji-yama or Fuji-san (12,425 ft.), a beautiful and perfect volcanic cone, now almost wholly extinct. Shikoku has non-volcanic ranges from 3,000 to 4,000 ft. in height. Kyushu has several volcanoes, of which Kirishima-yama (4,800 ft.) is the highest. Asosyama or Aso-san, still active in places, is remarkable for its crater, from ten to fourteen miles in diameter. Yezo also is volcanic. Formosa boasts the highest mountain in the Japanese empire—*viz.* Mount Morrison (14,300 ft.). Hot mineral springs are abundant. There are daily slight tremors, perceptible only by instruments, yearly six or seven severe shocks, and at

intervals of from forty to fifty years a terrible catastrophe, causing widespread destruction. One of these occurred at Yedo in 1855, and another at Nagoya in 1891. Destructive 'tidal waves,' produced by submarine earthquakes, are frequent. None of the rivers are of great size. The chief are the Tonegawa (*gawa* means

Lake Biwa, near Kyoto (36 m. in length); Lake Suwa, in Shinano; the Chusenji Lake, near Nikko; Lake Inawashiro, and the Hakone Lake. There are numerous fine waterfalls in the province of Kii, at Nikko, and elsewhere. The Kuroshiwo (black tide) current, which corresponds with the Gulf Stream of the Atlantic,

British subjects, 1,624 Americans, 647 Germans, and 505 French. The northern parts of the empire are proportionally much colder than places in the same latitude in Europe. In Tokyo, the mean temperature for twenty years ranged from 36°7' in January to 78°1' in August, the average for the whole year being 56°8'. The mean rainfall was 57.82 in. Most of the rain falls in May, June, and July; and there is far more fine weather in Japan, especially in the late autumn and winter, than in England. In Tokyo snow seldom lies long, but in Yezo the snowfall is heavy. Fogs are prevalent in summer in the northern parts of the empire. Japan is visited annually by typhoons, mostly in August and September. The prevailing winds are northerly in winter and southerly in summer. The climate is healthy, on the whole, though depressing on account of excess of moisture.

As to animal life, Japan has one species of short-tailed monkey and ten bats. Of carnivora, the largest (except the marine carnivora) is the bear, of which there are two kinds—a small black species peculiar to Japan, and a large brown bear (the grizzly of N. America) which is common in Yezo. There are no Felidae except the domestic cat. Badgers, foxes, otters, sea otters with most valuable furs, moles, hares, squirrels, wild boars, stags, and antelopes are found. Domestic mammals are the horse, ox, pig, and dog. Birds are the crow, kite, falcon, eagle, swallow, and jay; the uguisu (a singing bird), the skylark, and several finches. Waterfowl are very common; and also pheasants, wild pigeons, cranes, and herons. Reptiles are represented by ten ophidia, few of which are venomous. The most notable batrachian is the giant salamander, three or four feet long. Frogs and toads are plentiful. Fishes of numerous kinds furnish a large part of the food of the Japanese. Among Invertebrata there are 147 butterflies, 420 moths, many species of beetles and spiders, and cicadae and other noisy insects without number. With its wide range of climate and its lofty mountains, Japan has a great variety of vegetation. Savatier in his *Enumeratio* names 2,750 species. The shrubs are mostly evergreen, comprising many with beautiful flowers. There are also numerous evergreen oaks, laurels, and conifers. On the higher grounds we find more deciduous trees, as the elm, beech, walnut, birch, and chestnut. Bamboo clumps, low palms, and cycads in the lower grounds, recall the tropics. There are also hornbeams, maples with beautiful autumn foliage, planes, cam-



Area and Population.

	Sq. m.	Pop. (Dec. 1903).
Honshu	87,500	35,460,500
Shikoku	7,350	3,168,000
Kyushu	16,900	7,261,000
Smaller Islands	3,000	(Included in above.)
Total of Japan proper	114,750	45,889,500
Hokkaido	36,300	843,500*
Luchu	930	460,000
Formosa	13,500	2,925,000†
S. Sakhalin	12,000	(Est.) 10,000
Grand total	177,480	50,128,000

* Including 17,000 Ainus.
† 25,600 Japanese, the rest Chinese or aborigines.

*river'), in the plain of Tokyo; the Shinanogawa, which, after a course of 200 m., falls into the Sea of Japan at Niigata; and the Kisogawa, which, rising in the highlands of Shinano, falls into the Owari Gulf. Among lakes are

rises between Luzon and Formosa, and passes along the E. coast of Japan, finally losing itself on the shores of N. America. In 1903 there were 14,257 foreigners in Japan, more than one-half of whom were Chinese, 2,215

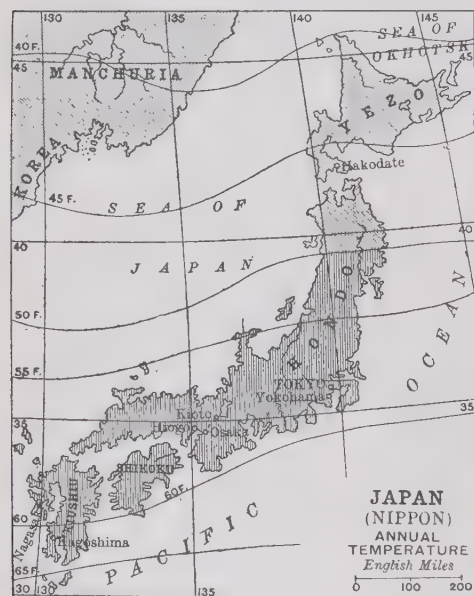
phor trees, etc. Fruits are excellent, and comprise oranges, grapes, pears and apples, loquats, pumelos, peaches, persimmons, figs, and raspberries. Our gardens owe many beautiful shrubs and flowers to Japan, as the *Lilium auratum*, kerria, pyruses, azalea, bamboos, chrysanthemums, *Rosa rugosa*, aucuba, and aralia. Ferns are very common, there being 173 species. See Dickens in Introduction to Murray's *Guide to Japan* (7th ed. 1903), and Rein's *Industries of Japan* (1889). For the botany of Formosa, see Henry in *Japan Asiatic Society's Transactions* (1896).

Fifty-five per cent. of the people are agriculturists. The chief agricultural soil consists of Tertiary and alluvial deposits, not rich,

and conveniently situated for irrigation, on which vast sums are spent. Barley and wheat are also grown, but the climate is unfavourable, being too moist at the time when they ripen. There are several varieties of millet and pulse. Maize is grown in small quantity. Hemp, cotton, tobacco, the sugar-cane, tea, and indigo are also grown. Colza, cultivated for its oil, is frequently grown as a stolen crop between two crops of rice. The sweet potato forms a large part of the food of the population of S. Japan, and the culture of the ordinary potato is extending in the N. The Japanese agriculturist depends much on hand labour, using oxen and sometimes horses for ploughing. The rotation of crops is hardly

eign engineers employed. The principal minerals extracted are coal (9,701,682 tons in 1902), copper, silver, gold, and iron. Copper is by far the most valuable of Japanese metallic ores. It is found in many places, and in enormous quantities. The mines of Besshi in Shikoku, and of Ashiwo near Nikko, are famous. Copper pyrites and copper glance are the chief forms which it assumes. The coal is of inferior quality. The best is that produced at Takashima, an island near Nagasaki. Foreign capital can now be invested in Japanese mines, under certain restrictions.

As to manufactures, silk is produced in large quantities. Many brocades and other rich and beautiful stuffs were formerly made,



but forming a deep, friable, easily-worked mould. The Quaternary alluvial argillaceous soils are more fertile, and, lying low, are well suited for irrigation. Much of the best rice land belongs to this class. The land is held from the crown by a tenure equivalent to our fee simple, most proprietors cultivating their own holdings. Recently many smaller owners have been compelled to sell their title-deeds and become farmers only. Taxation on land amounts to about 4 per cent. of its estimated value. Rice is the chief crop. It is sown in seed beds, and planted out in early summer. It must be kept growing in a few inches of water for several months. Rice land must therefore be flat or terraced,

known, not being suited to the conditions of rice cultivation. The Japanese government devotes much attention to agriculture, which furnishes half the entire revenue. Large sums are spent annually on agricultural laboratories, schools of agriculture, exhibitions of produce, agricultural associations, experiments, stud farms, etc. See Rein's *Industries of Japan* (1889), and a Report on Agriculture prepared by the Japanese government for the Paris Exhibition of 1900.

Japan is only moderately rich in mineral wealth. Great progress has been made during the last thirty years in mining, foreign methods and machinery having been freely introduced and for-

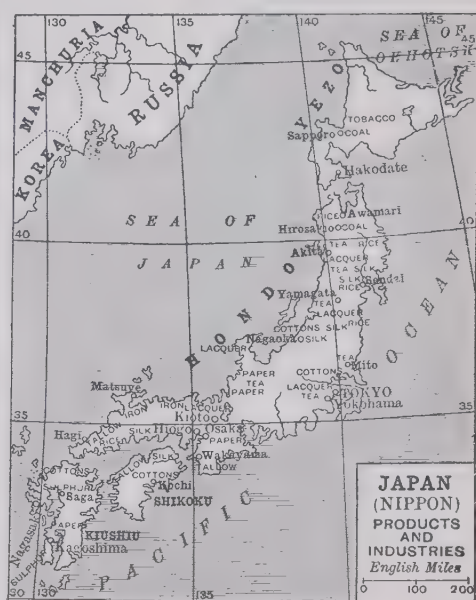
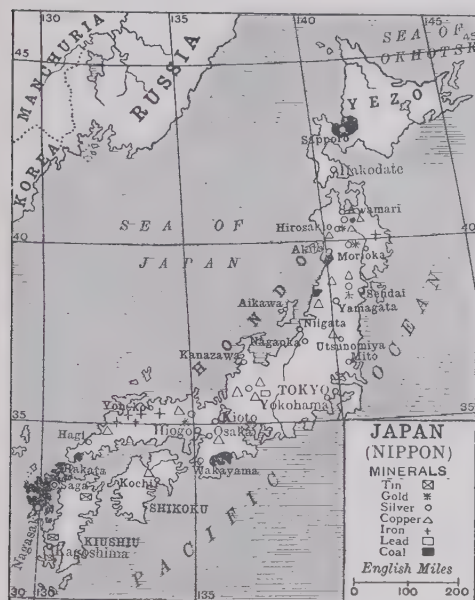
but of late years chiefly thin washing silks, crape, and handkerchiefs for export. Within the last fifteen years numerous cotton-spinning mills with British machinery have been established at Osaka and elsewhere. Japan is now an exporter of this material to China and Korea. Lacquer has been made in Japan for twelve hundred years. It is often ornamented with beautiful designs, in which mother-of-pearl, gold in the form of dust or leaf, ivory, etc., are utilized. Earthenware is made everywhere. The best-known kinds of art pottery are made in Satsuma, at Imari in Hizen, at Kutani in Kaga, and Kyoto. (See Brinkley's *Japan and China*.) Other art industries are enamels (*cloisonné*) on earthen-

ware and copper; articles in bronze, iron, and other metals; and embroidery. The bamboo is made into an endless variety of useful objects. The paper of Japan is made from the inner bark of the paper mulberry and other trees. A variety known as Japanese vellum is much valued by art publishers; stamped wall paper is a considerable article of export; and paper of European style and materials is also manufactured. Printing reached Japan from China. Books were first printed in the 10th century, but some printed slips from blocks cut 770 A.D. are in existence. Movable types were introduced at a comparatively late period. Other manufactures are screens, fans, parasols, jinrikishas, soap,

in 1904 at over £69,000,000 (excluding Formosa). The trade is conducted chiefly at Yokohama and Kobe, the figures for Nagasaki, Hakodate, Niigata, and Osaka being very small. The total number of ports now open to foreign trade is thirty (exclusive of Formosa). Of the total foreign trade for 1903, £18,660,000 was with Great Britain and its possessions, and £13,000,000 with the United States. The principal imports were rice, cotton, wool and woollen fabrics, metals and metal manufactures, machinery, kerosene, and sugar. Exports included silk and silk manufactures (£13,571,389), tea, rice, camphor, matches, coal, and copper. In 1903, 9,038 ships of 13,572,000 tons entered at

which circulates at par. In 1897 the gold standard was adopted with the ratio to silver of 1 to 32½. The mint is at Osaka. It was established under British management in 1871, but has been since 1889 under exclusively Japanese control.

The laws of Japan, formerly based on those of China, have now been radically reformed upon European principles. The criminal law follows the Code Napoléon. The police are organized after European models. The civil law is characterized by the prominence given to the family instead of the individual as the social unit. The judicial system much resembles that of France. The high court is at Tokyo, the appeal courts at Tokyo, Osaka,



matches, mattings, *sake* (rice beer), and beer.

Ordinary roads, though greatly improved, and now for the most part macadamized, still leave much to be desired. The first railway was opened in 1872. In 1903-4, over 4,650 miles were in operation, of which 1,500 are government trunk lines. Japan is a member of the Postal Union.

Shipping has developed greatly. Against 258 ships (excluding junks) of 62,753 tons in 1877, Japan now owns over 1,100 steamers with a tonnage of 700,000, and 3,500 sailing vessels of 322,000 tons. Foreign commerce has developed rapidly since it began in 1859. In 1868 the total imports and exports were valued over £2,623,000, and

the open ports. Of these, 1,777 and 4,758,534 tons were British. Banking in Japan dates from 1872, when a system of national banks was inaugurated under government auspices. In 1880 the Yokohama Specie Bank was established for the convenience of Japanese merchants engaged in foreign trade. It has branches in London, New York, Bombay, and other places. The Bank of Japan, corresponding to our Bank of England, was founded in 1882. The Japanese currency follows the decimal system, the unit being the yen or dollar of about two shillings: 100 sen (cents) = 1 yen; 10 rin = 1 sen. The chief circulating medium, however, is a state paper currency

Nagoya, Hiroshima, Nagasaki, Miyagi, and Hakodate.

Since 1868 great progress has been made in substituting a system of national education on European models for the old Chinese methods. There are two universities, at Tokyo and Kyoto. There are also schools of art, commerce, agriculture, technical and normal schools, kindergarten, and schools for the higher education of women. Education is compulsory, but not free, except for the very poor. Although, as regards all the outward tangible elements of civilization, Japan has made great and substantial progress, the Japanese are nevertheless still an Asiatic nation. Language and anthropology show

that the predominant element in the Japanese race is Mongol. There are two types—one more refined, with thinner and higher nose, more slanting eyes, and smaller mouth; the other, and more common type, having a broad face, flattish nose, and coarser frame. Both have the Mongol sallow complexion, straight black hair, scanty beard, broad skull, and high cheek bones. The average height of the adult Japanese is five feet for men, 4'6" for women. Some trace a Polynesian or Malay element in the population, and there is undoubtedly a small Ainu admixture. The Ainus, a kindred race more barbarous than the Japanese, formerly occupied a large part of the main island. Only a small remnant of about 17,000 now survives. Formosa is peopled partly by an aboriginal population of Malay affinities, and partly by Chinese settlers.

After the revolution of 1868, the Japanese government was reconstituted on the model of one thousand years before; but, especially between 1882 and 1889, many reforms were effected, the general result of which was to substitute a constitutional monarchy for the former (theoretical) autocracy. The chief author of this great change was Marquis Ito Hirobumi. In 1888-9 the local administration was reorganized, somewhat on the lines of the French prefectural system. There are three cities (Tokyo, Kyoto, Osaka), and forty-three departments (*ken*) administered by prefects, the local assemblies having a large voice in the management. The Hokkaido (Yezo and the Kuriles) and Formosa are separately administered. On Feb. 11, 1889, was promulgated what may be called the Magna Charta of Japan. It provides for the imperial succession, defines the prerogative of the crown and the privileges of the people, declares the obligation of the latter to pay taxes and to serve as soldiers, guarantees them against arrest, imprisonment, trial, or punishment except by due process of law, grants freedom of residence and conscience, and provides that no man's house shall be officially entered without a legal warrant. Two houses of parliament were established. The House of Peers consists of princes and marquises, with a certain proportion of the lower ranks of nobles elected by themselves, some of the highest taxpayers chosen locally, and a proportion of members nominated by the sovereign. The House of Representatives consists of 369 members. Voting is by secret ballot, and the representatives are paid.

RELIGIONS.—Shinto—that is to

say, the 'way of the gods'—is the indigenous religion of Japan. It is in the main a nature-worship. The gods are innumerable, the chief among them being the sun goddess, from whom the Mikados are supposed to be descended. There are also creator gods, gods of wind, fire, food, mountains and rivers, with, in later times, a number of deified human beings. Beyond the annual local festivals, there are hardly any regular religious services. The priests are not celibate, and wear no special garb when not engaged in worship. The temples, which are very numerous, are simple structures. Buddhism was first introduced in 552 A.D. from Korea. It is a branch of the northern form of that religion, known as the Mahayana, or 'great vehicle.' In Japan it has become split up into numerous sects. Buddhism has a far more gorgeous ritual, finer temples, and a more organized priesthood than Shinto. Confucianism was first introduced into Japan in the 5th century, and its study reached a climax under the Tokugawa Shoguns, when its principles became the chief rule of life for the educated classes of Japan. Loyalty to chiefs and rulers, and filial piety, are the chief duties which it inculcates. Shinto, Buddhism, and Confucianism are not, like our Christian sects, mutually exclusive. A man may, and usually does, belong to all three at the same time. For the whole subject of the religions of Japan, see Griffiths's work with that title.

Japan tolerates all religions. There are missionaries of about forty different denominations. Among Protestants the English Church is strongly represented. There are also many American Baptists, and missionaries of the American Board Mission. But in 1900 the converts of all Christian sects did not amount to more than 125,000.

ARMY AND NAVY.—The Japanese army numbers on a peace footing 168,000 officers and men, and on a war footing 632,000. It is raised by conscription, and is armed, clothed, drilled, and organized after the best European models. Its efficiency was proved in the war with China (1894-5), and still more in the war with Russia (1904-5).

The navy consists of five first-class steel line-of-battle ships of from 12,000 to 16,000 tons, all built in Great Britain; two second-class line-of-battle ships, of which one was built in Germany and one in Great Britain; twenty steel cruisers of from 2,500 to 10,000 tons, mostly built in Great Britain, but a few in Japan; with a proportionate number of dispatch-boats, gunboats, and tor-

pedo-boat destroyers. The armament is for the most part of Krupp manufacture. In addition, the Japanese navy has now been greatly augmented by the ships captured during and those raised after the war with Russia. These include six battleships, four cruisers, and a few other vessels, having a total displacement of over 100,000 tons. There are also several warships now in course of construction in Japanese yards. There are some 36,000 officers and men on the active list, about half the men being volunteers, half conscripts. There are four naval stations, well equipped with docks for the largest vessels, arsenals, etc.

HISTORY. *Early Period.*—Modern Japanese historians begin with the Mikado Jimmu, who is stated to have ascended the throne 660 B.C. But the more trustworthy contemporary records of China and Korea show that for more than a thousand years after the supposed date of Jimmu's reign, nothing existed in Japan which deserves the name of history. About the date of the Christian epoch, Chinese travellers found a monarch established in Yamato, who ruled over a large part of the present Japan. For many centuries after this the capital was not fixed, but was changed with every new reign. The year 3 A.D. is assigned as the date of the abolition of human sacrifices on the occasion of the funeral of the Mikado. The legend of Yamato-dake, a prince of whose valour in conquering the Ainu tribes of E. Japan many wonders are related, has also no doubt a solid nucleus of fact. It is assigned to the 1st century. Another fact which may be taken as proved is that, about the second century of our era, Japan was ruled by a female Mikado of great abilities, who is reputed to have conquered Korea. Among other elements of civilization which found their way to Japan from Korea during this period was a knowledge of the Chinese written character and literature. The government of Japan was in those times, as it always has been, a hereditary monarchy. The local authorities were also hereditary, and were but little under the control of the central government. We reach surer ground with the beginning of the 6th century, when a great wave of Chinese civilizing influences passed over Japan. The government was reorganized on a Chinese model, and its effective jurisdiction in the provinces was much extended. Local governors were appointed from the capital in the place of the former hereditary chieftains, and a new system of taxation was introduced.

One of the principal leaders of this movement was Shotoku Daishi (572-621), son of the Mikado Yomei, who was regent under the Empress Suiko, but never actually ascended the throne. His great achievement, however, was the establishment of Buddhism on a far broader and more solid basis than before. The 7th century is notable for the downfall of Japan's influence in Korea. The Fujiwara noble family, or rather clan, which has given to Japan so many scholars and statesmen, and provided the Mikados with a long line of consorts, first came into notice during this period. Its founder was the statesman known as Kamatari Ko.

Nara Period.—The 8th century coincides roughly with the Nara period of Japanese historians. Nara is a city of Yamato, to which the capital was transferred in 710 A.D., and it continued to be the seat of government until 784. The Taiho rio, a code of law based on the legislation of the Chinese Tang dynasty, and drawn up in 702, was an enormous advance on anything of the kind which had preceded it. Literature, architecture, and sculpture all made great progress. To the quickened Buddhist influences of this period was due the custom which the Mikado began, after some years of reign, of resigning the crown to his successor and entering religion. This was a conspicuous feature of Japanese history for many centuries. During part of the Nara period the power of a Buddhist priest named Dokio, who had been raised to the position of prime minister, overshadowed the throne in such a way as to bring upon him great odium. He was eventually removed from office and banished by a devoted patriot named Kiyomaro (770).

Heian Period.—In 794 the capital was established on the site of the present city of Kyoto, under the name of Heianjo, or the 'city of peace,' and it continued to be the residence of the Mikados until the revolution of 1868. During the early part of the Heian period, the Fujiwara family attained to a position of unparalleled influence. The office of Kwambaku, or regent, was hereditary in this family, and as the practice grew of each Mikado, after a few years' reign, resigning in favour of a younger relative, the importance of this office far outweighed that of the crown itself. But the imperial prestige, though beclouded, was never allowed to become extinct. Even when the Mikado was virtually kept a prisoner in his palace by some powerful noble, he was still recognized as the fountain of

rank and authority, to whom high ceremonial reverence was due. Under the rule of the Fujiwaras, which lasted until the middle of the 11th century, Japan enjoyed great material prosperity. Schools were established, and learning—i.e. Chinese studies—flourished. This was the Augustan age of Japanese literature. Eventually two other noble houses, known as the Gen (or Minamoto) and the Hei (or Taira), began to struggle for supremacy. Both were of imperial origin, and the source of the power of both was in the remoter provinces, where a strong military system had gradually become developed. Their struggles convulsed the country for the last hundred and fifty years of the Heian period. The advantage was at first with the house of Hei. Its power reached a climax under the leadership of Kiyomori (1118-81), who used his authority in the most arbitrary manner. In a great naval battle fought between the two rival factions at Dannoura, close to Shimonoseki, the power of the house of Hei was completely shattered, and their leader was captured. The disturbed state of the country brought about a partial relapse into barbarism, while another unfavourable condition was the interruption of intercourse with China, and the consequent cessation of the flow of civilizing influences which had done so much for Japan.

Kamakura Period (1185-1332).—After the battle of Dannoura, Yoritomo, the representative of the Gen family, established his government at Kamakura, not far from Yokohama. The permanent Shogunate dates from this time. Yoritomo succeeded by degrees in consolidating his power over the Daimios, as the provincial nobles now began to be called. Yoritomo died in 1199. His descendants ruled only in name, the real power being wielded by men of the Hojo family, under the title of Shikken or directors. In 1221 the court of Kyoto, jealous of the increasing power of the Hojo, sent an armed force against them. It was defeated, the Mikado Jun-toku deposed and banished to a distant island, as well as an ex-Mikado who had been the prime mover in this enterprise. The power of the Hojo was greatly increased by this attempt to destroy it. But it came to an end in 1333, when a new and more successful expedition was directed against it by the Mikado Go Daigo, whose previous opposition to the Hojo had been punished by dethronement and exile. The Kamakura period is memorable for the destruction, partly by a storm and partly by force of

arms, of the great armada sent by the Mongol emperor of China, Kublai Khan (1275-81), to punish Japan for her piratical depredations upon the coasts of China and Korea. Under the Hojos, learning, literature, and the arts fell into a state of decay from which they were long in recovering. This and the following two periods are the dark age of Japanese history.

Namboku-cho Period (1332-92).—The restoration of the Mikado's power under Go Daigo proved to be more apparent than real. Ashikaga Takauji, one of the military chiefs to whom he owed his recall from exile, had himself appointed Shogun in 1336. He was the founder of the Ashikaga line of Shoguns, which lasted until 1573. He soon withdrew his support from Go Daigo, and established a creature of his own at Kyoto as a rival Mikado. Meanwhile Go Daigo had retired to the province of Yamato, where he and his successors maintained a precarious independence until 1392, when the two lines of Mikados were reunited in the person of Go Komatsu.

Muromachi Period (1392-1603).

—This period, so called from the place of residence of the Shoguns at Kyoto, was a time of great anarchy in Japan. The proposed arrangement of allotting the imperial dignity alternately to the two imperial lines was not carried out, to the great discontent of the adherents of the neglected family. The power of the great territorial nobles had greatly increased, and in the absence of any effective central control they engaged in continual wars with one another. In 1542 Japan was first visited by a European ship, a Portuguese merchant vessel. In 1549 the Jesuit missionary Francisco Xavier arrived at Kagoshima, and was succeeded by a number of missionaries, whose labours were attended with remarkable success. It is computed that in 1582 there were about 600,000 Christians in Japan, and at the beginning of the 17th century they numbered about one million. The rescue of Japan from its long-continued anarchy was due to three men of the eastern military caste—viz. Nobunaga, Hideyoshi, and Iyeyasu. Nobunaga, originally lord of the province of Owari, after annexing by conquest the territories of several of his neighbours, established himself in Kyoto, where he built a stately castle. But his self-imposed task of pacification was still incomplete when he was murdered (1582) by one of his own captains. It was, however, taken over by Hideyoshi, another captain, who, although unlearned and of mean



Scenes in Japan.

1. Tennoji Temple, Osaka. 2. Nagoya Castle. 3. Theatre Street, Yokohama. 4. Interior of Iyemitsu Temple, Nikko. 5. Temple at Shiba, Tokyo. 6. Daibutsu, bronze image, Nara. 7. Nagasaki Harbour, from Akunoura. 8. Revolving Lantern, Nikko.



birth, was a man of indomitable resolution and great military talent. In 1588 he had himself appointed *taiko*, or regent, and in 1590 the last of the unruly Daimios tendered his submission. The arrogant and intolerant attitude and the greed for power of many individual missionaries induced Hideyoshi to order the expulsion of the Jesuits. In 1596 a new edict was issued, under which six foreign priests were crucified at Nagasaki, along with a number of their converts. The concluding years of Hideyoshi's life were stained by the unprovoked invasion of Korea (1592-8). Few of the inhabitants escaped destruction, and a still smaller proportion of their goods and chattels. To this day Korea has not recovered from the devastation. The Chinese, however, against whom the expedition was ostensibly directed, at length beat back the Japanese.

Yedo Period (1603-1868).—Hideyoshi, dying in 1598, bequeathed his authority to his son Hideyori, a lad seven years old. But Iyeyasu, a powerful eastern noble who had served with distinction under Nobunaga and Hideyoshi, soon found it necessary to assume the reins of government. He defeated the Daimios who supported Hideyori's claims, in the bloody and decisive battle of Sekigahara (1600). Three years later he was made Shogun, thus founding the Tokugawa military rule of Shoguns, which lasted until 1868. Iyeyasu was the greatest statesman that Japan has known. To his genius is due the system of government under which Japan enjoyed peace for two and a half centuries, and grew enormously in wealth, enlightenment, and civilization. The vital feature of his *régime* was the arrangement for the control of the feudal nobles, or Daimios. They were divided into two classes. The first, termed *Fudai*, or hereditary nobles, consisted of Iyeyasu's original adherents. Lands were granted to them, skillfully disposed in such a way as to command the territories left to the other class called *Tozama*, or 'outer' nobles, embracing those Daimios who had only yielded a reluctant allegiance after the battle of Sekigahara. Their position somewhat resembled that of mediatized princes in India under British rule. Both *Fudai* and *Tozama* Daimios enjoyed fiscal and judicial autonomy within their own dominions, but they might be deposed or transferred elsewhere for incompetence or misconduct. If there was no legal heir, the Shogun might take possession of the estates. He also reserved the right to control such foreign

relations as continued to exist, of making war and peace, of a veto on the marriages of the Daimios, and the management of the great highways. A most important feature of the Tokugawa system of government was the rule, initiated by the third Shogun, Iyemitsu, by which the Daimios were obliged to reside in Yedo, the capital of the Shogunate, for part of every alternate year—a provision which was subsequently extended by compelling them to leave their families there as hostages during their absence. This, with the general prosperity of the country, led to an enormous increase in the population of the capital, which in the last century is believed to have reached nearly two millions. The eight rich provinces adjoining Yedo, which Iyeyasu had made his capital, were under a different *régime*. They were occupied by the *Hatamoto*, a minor class of nobles, who were wholly dependent on the Shoguns. It was from these provinces that their revenues were mainly drawn, and the functionaries of their court and administration derived. Iyeyasu also took care to placate the Mikado, by causing a new palace to be built for him, and by taking other steps for his material welfare. But no real authority was allowed him during the Tokugawa period. The persecution of Christians, begun by Hideyoshi, was continued under his successor. In 1614 he ordered, partly on political grounds, that all foreign Christians should be expelled from Japan. From this time onward Iyeyasu and his successors treated the adherents of the alien faith with increasing severity, thousands being put to death. The final act in the tragedy was the Christian rebellion of Arima (1637-8), which was suppressed by the capture of the Christian stronghold, and the massacre, it is said, of 40,000 Christians. When Japan was reopened in 1859, a few ignorant peasants, inhabiting a valley close to Nagasaki, were all that remained of the once flourishing Christian church of Japan. Under one of Iyeyasu's successors trade was prohibited (1624) to the Spanish and Portuguese. The Dutch and Chinese were allowed to continue sending ships to Japan, but they were confined to and almost imprisoned in narrow settlements, and conducted trade under great restrictions. The English East India Company had a factory at Hirado from 1614 to 1623, when it was withdrawn, having been found unprofitable. Notwithstanding religious troubles, a few *ikkō*, or agrarian riots, and an occasional quarrel between the

Daimios, the Yedo period was, on the whole, a time of peace and progress. But in the 19th century there were symptoms of approaching change. The peasants were uneasy under a grievous load of taxes, levied to supply the means by which Shoguns and Daimios maintained vast numbers of useless officials and so-called soldiers, and kept up a state ridiculously disproportionate to their real power. Some collisions with British and Russian men-of-war early in the century revealed the utter disorganization of the Japanese military system. The control of the central government had become relaxed to such a degree that many of the western Daimios were practically independent. Another movement which was silently sapping the Shogun's power was the revival of the old Shinto religion, with its doctrine of the divine right of the Mikados, as the descendants of the sun goddess. The disintegrating influence of European ideas should also be noted. A small but enthusiastic body of students had learned Dutch as a medium for acquiring the art of medicine and some knowledge of military matters, thus preparing the way for the wholesale adoption of foreign ways which took place after the revolution of 1808. Such was the state of affairs when Commodore Perry (1853) arrived in the Bay of Yedo, in command of four ships of war, and bearing with him a letter from the president of the United States, in which he proposed the establishment of commercial relations with Japan. A Russian ship arrived at Nagasaki in the same year on a similar errand. The Shogun's government had recourse to the usual policy of the weak—*viz.* delay. But when Perry arrived a second time with an increased force, they reluctantly signed a treaty by which several ports in Japan were opened to commerce. Subsequently treaties were concluded with other powers. They provided for the opening of Kana-gawa (Yokohama), Nagasaki, and Hakodate to commerce at once, and of Yedo, Osaka, Niigata, and Kobe after an interval of a few years. It was stipulated that all cases in which foreigners were accused or defendants should be tried by the foreign authorities concerned—the so-called extrajurisdictional clause. These treaties came into effect—practically—in 1859, from which date a new era began in the history of the foreign relations of Japan. The Shogun was now charged by the Daimios with pusillanimously yielding to the demands of the barbarians, with making treaties without the

Mikado's consent, and with greedily appropriating the profits of foreign trade. The Tairo (regent during the Shogun's minority), Ii Kamon no Kami, made a brave attempt to maintain the authority of the Shogunate; but his career was put an end to by his murder, in 1860, at the very gate of the Shogun's castle. The Mikado, instigated by some of the western Daimios, now began to assert his authority in an unwonted manner, and in the same year he directed the Shogun to take steps for the expulsion of the barbarians. And not only did a number of foreigners fall victims to the hate of the two-sworded class (Samurais, or military caste), but distinguished Japanese who defended the new state of things were also slain by them, and the Samurai even murdered native merchants who offered European wares for sale. The murder in 1862 of an Englishman named Richardson on the Tokaido (the great highway from Yedo to Kyoto) by the retainers of Shimadza Saburo, a Satsuma noble, led to the bombardment and burning of Kago-shima by a British fleet. Meanwhile the Daimio of Choshu, whose forts commanded the Straits of Shimonoseki, began to fire on foreign vessels of various nationalities which were passing through the straits. At Kyoto his retainers made an audacious but unsuccessful attempt to possess themselves of the person of the Mikado. On this occasion a great part of that city was destroyed by fire. To punish him, a squadron of British, French, American, and Dutch ships of war proceeded to Shimonoseki in September 1864, and after a hot engagement with the shore batteries, they landed and dismantled them. An indemnity of three million dollars was subsequently paid for this affair by the Japanese government. The Shogun, Hitotsubashi, a man of weak character, was eventually deposed in 1867 by the Mikado, acting in concert with the more powerful western Daimios. Fighting took place, first at Fushimi, near Kyoto, and subsequently in Yedo and Aizu (1868); but the Shogun's adherents were at length completely subdued. The new government was promptly recognized by the British minister, Sir Harry Parkes. It behaved with unexpected moderation, treating its beaten enemies with the utmost leniency, and restraining with a firm hand those of their followers who imagined that the restoration of the Mikado's authority was to be followed by active measures for the expulsion of the barbarians. The Mikado proceeded to Yedo, thenceforth known as Tokyo, or

the 'eastern capital,' and the work of reorganization was begun with great vigour. A most important and necessary change was the abolition of the feudal system. Strange as it may appear, the demand for its discontinuance came from the Daimios themselves. In 1869 the Daimios of Choshu, Satsuma, Tosa, Hizen, Kaga, and others, who had taken a leading part in the revolutionary movement, presented a memorial giving up to the Mikado their lands, revenues, and vassals. The ex-Daimios and their retainers received pensions, and their territories were gradually but rapidly reorganized as prefectures in complete subjection to the central government. Buddhism was disestablished and Shinto made the court religion, a mint opened, postal and telegraph services organized, a railway constructed between Tokyo and Yokohama (1872), the army and navy Europeanized, a system of national education introduced, and, indeed, every institution of the country reformed in the light of European ideas. Never was there a more complete and radical revolution in any country. It was not accomplished without difficulty. Several of the leading reformers met their death at the hands of assassins; and in two of the very provinces (Hizen, 1876; Satsuma, 1877) which had done most to promote the restoration of the Mikado there were dangerous rebellions. Formosan savages who had murdered some Japanese subjects were chastised by an expedition sent against them in 1874. As Formosa belonged to China, this nearly led to war with that country; but the difficulty was ultimately arranged by the payment of an indemnity to meet the cost of the expedition. Luchu was annexed in 1879. The arrangement by which foreign powers had jurisdiction over their subjects resident in Japan was long a sore point with the Mikado's government; and at last, in 1899, foreigners resident in Japan became amenable to Japanese law. At the same time, the Japanese recovered their tariff autonomy, which had been heavily shackled by the old treaties. The constitutional government promised by the Mikado in the early years of his restored power became at length a reality in 1889, and, although it has not worked very smoothly, is now an integral and indispensable part of the government. The war with China in 1894, arising out of the claims of both countries on Korea, did much to enhance the power and prestige of Japan. The Japanese were successful at every point. A land force compelled the Chinese to evacuate

Korea, while their fleet, after inflicting a decisive defeat on a Chinese squadron, proceeded to capture the important fortresses of Wei-hai-wei and Port Arthur. A peace was ultimately concluded, stipulating for a large indemnity, and for the cession to the Japanese of the province of Liao-tung. This last arrangement, however, was displeasing to Russia, whose protest was supported by France and Germany, with the result that the Japanese consented to accept Formosa instead.

In 1902 Japan took the important step of concluding a defensive alliance with Great Britain, and in 1904 the still more important step of offering firm resistance to Russia's encroachments in Korea. Declaring war upon Russia (1904), Japan by an unbroken series of brilliant victories drove the Russian forces back, and swept their navy from the seas. (See RUSSO-JAPANESE WAR.) The conclusion of peace and the signing of the peace treaty arranged at Portsmouth, U.S.A. (Oct. 14, 1905), by which Japan obtained the southern half of Sakhalin, Port Arthur, and adjacent territories, certain railway lines, and the suzerainty of Korea, was marked by the outbreak of riots in Tokyo and other cities, showing the popular displeasure at the concessions made by their envoys; but these riots quickly subsided. Another noteworthy event was the signing of a new Anglo-Japanese treaty at London (Aug. 12, 1905), having for its objects the maintenance of peace in Eastern Asia, the defence of the high contracting parties' special rights there, and the maintenance of the independence and integrity of China, with equal opportunities for the commerce and industry of all nations.

BIBLIOGRAPHY. — General History. There is no good history of Japan. That by Dr. Murray (1885) in the *Story of the Nations Series* is the best; but it is uncritical, especially in the earlier part. A *History of the Empire of Japan* was compiled by various Japanese authors for the Chicago Exhibition. Griffis's *The Mikado's Empire* (1883) and Rein's *Japan* (1881-6) contain epitomes of Japanese history. The *Kojiki* gives the mythology and history to A.D. 628. A translation of this work by Chamberlain was published by the Japan Asiatic Society in 1882. The *Nihongi*, translated by Aston for the Japan Society in 1896, and partially by Florenz into German for the German Asiatic Society of Tokyo, extends to 697 A.D. Consult also Brinkley's *Japan and China* (1903-4); Murdoch's *History of Japan*; Aston's 'Early Japanese

History, in *Japan Asiatic Society's Transactions* (1888); 'Staatsliche und Gesellschaftliche Organisation in alten Japan,' by Florenz, in *German Asiatic Society of Tokyo* (1890); and an article by Dickens in the *Historical Review* (May 1899). Mediæval: Klaproth's very inaccurate translations from Japanese works, under the title *Annales des Empereurs de Japon*, cover the period down to 1600 A.D. Modern: Adam's *History of Japan* (1874-5) gives a sketch of ancient and mediæval history, but deals chiefly with the foreign relations of Japan from 1859 to 1871. *The Life of Sir H. Parkes* (1894), vol. ii., by Dickens, contains much useful historical material for 1865-83. Consult also a translation by Satow from a Japanese work named *Kuise Shiriaku*, which covers the period from 1853 to 1869; and *The Life of Townsend Harris* (1895), by Griffis. Particular Episodes: For Hideyoshi's invasion of Korea, see Aston, in *Japan Asiatic Society's Transactions* (1878-83); Denning's *Life of Toyotomi Hideyoshi* (1890); Gubbins's 'Hideyoshi and the Satsuma Clan,' in *Japan Asiatic Society's Transactions* (1880). The Shimabara Christian rebellion has been dealt with by Riess in the *Transactions of the German Asiatic Society* (1890), and by Geerts in *Japan Asiatic Society* (1883). For the subject of the early Christian missions to Japan, see Gubbins in *Japan Asiatic Society's Transactions* (1878), and Charlevoix's *Histoire du Christianisme dans le Japon* (1715). For British trade in Japan, etc., in the early 17th century, consult *Voyage of Captain Saris*, edited by Satow for Hakluyt Society (1900); *Diary of Richard Cocks*, published for the same society in 1882; and an article by Riess in *Japan Asiatic Society's Transactions* (1898). Mounsey's *Satsuma Rebellion of 1877* (1879) contains useful material. See also Clement's *Handbook of Modern Japan* (new ed. 1905); Gulich's *Evolution of the Japanese* (4th ed. 1905); Ransome's *The Japanese in Transition* (1899); Harts-horne's *Japan and her People* (1903); *Japan by the Japanese* (1904); Davidson's *Present-Day Japan* (1904); Stead's *Great Japan* (1905); Scherer's *Young Japan* (1905); Dyer's *Dai Nippon* (1905); and Baron Suyematsu's *The Rising Sun* (1905). Wenckstern's inaccurate but useful *Bibliography of the Japanese Empire* (1895, pp. 94-110) gives a list of numerous other works and articles on Japanese history.

LANGUAGE.—Japanese is one of the Ural-Altaic languages—that is to say, it is agglutinative. Much

importance is attached to the order of words in the sentence, the guiding principle being that qualifying words precede the words which they qualify. The oldest monuments of Japanese show us a language almost free from foreign admixture, but in historical times there has been a great influx of Chinese words, which now far outnumber those of native origin. They are used for similar purposes to those for which we have recourse to Latin and Greek. Japanese is euphonic and easy of pronunciation. But the difficulty of thoroughly mastering it is formidable, owing to the necessity of learning several thousand Chinese characters in order to read even tolerably well, the extensive vocabulary, and the separate grammars for the spoken and written languages. Other languages spoken in the Japanese empire are Luchuan, a very closely related sister tongue; Aino or Ainu, the language of the aborigines of Yezo, of ill-ascertained affinities; and the Chinese and Malay dialects of Formosa. Ordinary Japanese writing is a mixture of the Chinese ideographic character for the roots of words and a phonetic syllabic character called *kana* for the terminations and particles—as we write '8th,' which is a combination of an Arabic ideograph with Roman phonetic characters. There are forty-seven syllables, represented by several hundred *kana*. Attempts to replace this troublesome system by the Roman letter have not been successful. See Aston's or Chamberlain's Japanese grammars and manuals and Hepburn's or Brinkley's dictionary.

LITERATURE.—In Japan, books are written either in Japanese or in Chinese. Chinese is preferred for history, science, law, and theology—in short, for all serious subjects; while Japanese is the language of essays, poetry, fiction, the drama, and, in recent times, for the magazine and newspaper press. The earliest extant book, a mythological and historical work called the *Kojiki*, belongs to 712 A.D. It is written in a strange compound of Japanese and Chinese. The *Nihongi*, composed in Chinese, followed in 720. It is also a history. Both contain a number of more ancient poems of an unimaginative primitive kind, which are the oldest extant specimens of any Ural-Altaic language. Another archaic monument is the *Norito*, or liturgies of the Shinto religion, belonging probably to the 7th and 8th centuries. The poetry of Japan is contained chiefly in the collections called the *Manyōshū* (collection of 10,000 leaves) and

Kokinshū (ancient and modern collection), made in the 9th and the 10th century respectively. Japanese poetry has no rhyme, accent, or quantity. It is distinguished from prose by the regular alternation of phrases of five and seven syllables, and by the exclusion of words of Chinese origin. There are no epics, no didactic, philosophical, or satirical poems, and indeed no long poems of any kind. The favourite metre is a stanza of thirty-one syllables, which constitutes the entire poem. Praise of love or wine, longing for absent dear ones, elegies, sententious ejaculations, emotion at the various aspects of nature—these are the favourite subjects of the Japanese poet. But the narrow space to which custom has confined him has been a great bar to progress in the art. It is only in our own day that, under European influences, he has made bold to overstep its traditional limitations. The great age of prose composition was the Heian period (794-1185). It has left us a considerable mass of fiction, essays, and a few quasi-historical works, containing a strong element of romance. Curiously, the two greatest writers of this time were women—officials of the Mikado's court. One, Murasaki no Shikibu, is famous for a portentously long novel of Kyoto court life, named the *Genji Monogatari*, and the other, Sei Shonagon, for a series of charming essays and sketches called *Makura no Soshi*. From the end of the Heian to the beginning of the Yedo period Japanese literature did not flourish. It has left us the *Heike Monogatari* and the *Taishiki*, two histories in which are recorded, with much rhetorical flourish and embroidery of romantic details, the wars that then devastated Japan. The principal literary interest of these periods attaches to some essays, tales, and sketches by a Buddhist priest named Kenkōboshi (14th century). The drama dates from about the same time. As in other countries, it was at first associated with religion. The *No* are short lyrical pieces of six or seven pages, which could be acted in an hour. Two or three hundred of these remain, most of them belonging to the 15th century. Their subject is usually some monkish legend, but they are not without poetic merit. The political movement which culminated in the establishment of the Tokugawa Shogunate was accompanied by an intellectual revival. Chinese political and moral philosophy were earnestly studied, and a literature which derived its inspiration from this source was the result. It was the day of the



Japanese Art.—I.

(Examples mostly from paintings on silk in the British Museum.)

1. Lady rewarding strolling musicians, by Hokusai. 2. Frog, by Hokusai. 3. Flowers and birds, by Kano Motonobu. 4. Pea fowl and pine tree, by Yusei. 5. Strollers, by Hanabuso Itcho. 6. Humorous sketch, by Kiosai. 7. Arhat, by Cho Densu.



Japanese Art.—II.

1. Eagle in hammered iron, by Miyôchin Muncharu, 16th century. 2. Stone basin and bronze dragon, Mitake. 3. Eleven-faced kwanon, in wood, 14th century, Kyoto. 4. Antique image, in wood, Nara. 5. Satsuma ware vase, finest middle period, Bowes Collection. 6. Kaga dishes, Bowes Collection.

Kangakusha (Chinese scholars), as they were called. The number of their works is appalling. They comprise commentaries on the Chinese classics, moral treatises, works on government, history, and philosophy, and they have done much to mould the national character and determine the moral standards of the modern Japanese. There was a revival during the Yedo period of the Shinto religion. It had a literature of its own in a pure Japanese style, illustrated by the great names of Motoöri and Hirata. The popular literature of Japan during the Yedo period is extremely voluminous. A popular drama (*Joruri*), suited to a less refined public than the audiences of the *No*, was created towards the end of the 17th century by Chikamatsu. In the 17th and 18th centuries Saikaku, Jisho, and Kiseki produced numerous stories and sketches, more notable for their literary merit than for their moral tendency. The end of the 18th and the beginning of the 19th century are illustrated by the names of Kioden, Bakin, and Tanechiko, writers of romantic stories replete with wonderful incidents. The *Hiakkinden*, one of Bakin's works, is contained in 106 vols. Novels of sentiment were largely written in the first half of the 19th century, when there also flourished Samba and Ikku, two humorists of no small merit. The *Hizakurige* of the latter is a most amusing book. It relates the picaresque adventures of two worthies named Yaji and Hida on their travels along the great highways of Japan. Fiction received a fresh impulse from the stirring of national thought caused by contact with European ideas in the second half of the last century. There is at present a promising and most prolific school of novelists who have learned much from Europe—Roban, Bimiyosai, and Koyo being among the most distinguished. There is also a vast magazine and newspaper literature. See Aston's *History of Japanese Literature* (1899), and Chamberlain's *Classical Poetry of the Japanese* (1878).

ART. Painting.—Tradition says that the art of painting was first introduced from China in Yuriaku's reign (457-479). The oldest extant picture is a Buddhist mural decoration in a temple near Nara. Many of the artists of this time were Chinese or Koreans, and Buddhist and Chinese influences prevailed for a long time. There have been numerous schools of painting in Japan, some close imitators of the Chinese, others of a more distinctively national character. From the 9th century onwards

several schools aroseⁿ which, partly from domestic troubles over the rise of the Shogunate, gradually showed decay. In the 15th century there was a great revival of the art under Chinese influence. Three important schools arose, named respectively the Sesshu (after one of the greatest of Japanese artists), Kano, and Chinese and Yamato-Tosa or national schools, which in subsequent times branched off into subdivisions too numerous to mention. Among the great painters of Japan were Cho Densu (d. 1427), the best and most original painter of the Buddhist school; Kano Motonobu (b. 1435), an avowed imitator of Chinese artists; Hanabusa Itcho, of the Kano school (flourished towards the end of the 17th century); Körin, who founded a school of painting in the 17th century, and was also an artist in lacquer; Okio, who died 1795, and was a close student of nature. To the 18th and early 19th centuries belongs the great name of Hokusai, who is chiefly famous as a book illustrator. He is remarkable for his wide range of art motives. Kiosai, his pupil, has also a great reputation. The works of Bunrin, a landscape painter (d. 1877), are distinguished by exquisite refinement and suggestiveness. Anderson enumerates the leading characteristics of Japanese art as follows:—(1) Remarkable command of pencil, probably resulting from the early education in the use of the brush in writing the difficult Chinese character; (2) high development of the sense of harmony in colour; (3) great power of composition; (4) disregard for close study of natural forms; (5) absence of chiaroscuro—ideal shadows used to produce effects of relief; projected shadows always omitted; (6) linear perspective disregarded. The art of chromoxylography has been carried to great perfection in Japan. See Anderson's *Pictorial Arts of Japan* (1886), and his *Catalogue of Japanese Pictures in the British Museum* (1886); Gonse's *L'Art Japonais* (1886); *Histoire de l'Art du Japon* (Imperial Japanese Commission to the Paris Exhibition, 1900); and the writings of Fenellosa, Byng, Huish, Brinkley, Strange, Hartmann, Munsterberg, and others.

Glyphic Art.—For want of a suitable material, Japan has done little in stone-carving, though many carved wooden idols are in existence which possess great artistic merit. Among these are the *Nio*, or temple guardians, in a temple near Nara, of which Anderson says that in their intense vitality of action and the scientific observation of anatom-

ical details of form, they are not unworthy of comparison with the masterpieces of ancient Greece. But these are exceptional performances. Wood-carving in later times has been chiefly applied to architectural ornamentation, of which the mausolea of Shiba, Uyeno, and Nikko, and some temples at Kyoto, contain examples of great merit. Ivory-carving takes the form of statuettes, or more frequently of *netsuke* (toggles for suspending the pipe-case to the girdle). Truth to nature, humour, and consummate skill characterize these tiny productions. Metal work is exemplified in the large bronze idols which are seen everywhere. The Daibutsu, or Great Buddha of Nara (749), is fifty-three feet in height, and that of Kamakura fifty feet. Much artistic skill is displayed in the ornamentation of mirrors, armour, sword appurtenances, bells, sacred utensils, etc., and in embroidery.

Music.—There is much disagreement among the authorities as to the nature of the scale. Müller says that it consists of five notes of the harmonic minor scale, the fourth and seventh being omitted. Piggott believes the normal Japanese scale to agree with that of modern Europe, though he allows the pentatonic character of most tunes. Isawa, a Japanese authority, says the second, fourth, and sixth intervals in the classical music of Japan are identical with those of Europe, but the major third is sharper and the seventh flatter. The scale for popular music, he adds, is different. Their instruments are the koto, a thirteen-stringed harp or lyre; the *samisen*, a three-stringed guitar; the *kokuji*, a sort of violin; the *sho*, a kind of mouth organ; with flutes and pipes, drums and cymbals of several descriptions. Consult Piggott's *Music and Musical Instruments of Japan* (1893), and Chamberlain's *Things Japanese* (4th ed. 1902).

Architecture.—The architecture of Japan much resembles that of China. Wood is the universal material for the walls and framework, which support a heavy tiled roof. There is a quaint charm about the temples and pagodas of Japan; but they have little grandeur, their chief beauty residing in the details of ornamentation. See papers by Conder in *Transactions of the Royal Institute of British Artists* (1886-87); also Morse's *Japanese Homes* (1885).

ARCHÆOLOGY.—The archaeological remains of the Japanese race date from a few centuries before the Christian epoch. The most remarkable are the sepul-

ohres of the Mikados, known as *nissasagi*. They take the form of huge double mounds enclosing a megalithic vault of unhewn stone without mortar. Some of the largest are as much as eighty or ninety feet in height. They are usually terraced, and ringed with rows of curious earthenware tubes of about a foot in diameter, associated by tradition with the clay figures of men and horses set up in former times round these mausolea as substitutes for living victims. Neither the tombs of the Mikados nor those of the nobles have any inscriptions. They have, however, yielded a large number of objects of antiquarian interest, such as wheel-made pottery of somewhat rude workmanship, earthen and stone sarcophagi, iron swords and spear heads, armour skilfully adorned with gold and silver, horse-gear of good workmanship, and jewellery. This style of sepulture fell into disuse about the 8th century, under the influence of Buddhist ideas. The antiquarian remains of the Ainu race are found in shell-mounds, resembling the kitchen-middens of Denmark. They consist of shells, fragments of broken bones, implements of stone and horn, and handmade pottery—all indicating a much lower grade of civilization than that of the Japanese. Stone celts, arrow heads, etc., similar to those of other parts of the world, have been found everywhere in Japan. The first authority on Japanese archaeology is Mr. W. Gowland. See his papers for the Japan Society (1897-8), and for the Society of Antiquaries (1897). The Gowland collection of ancient Japanese pottery in the British Museum contains one of the clay figures above mentioned. For Ainu remains, consult Morse's *Shell Mounds of Aomori* (1879). Kanda's *Ancient Stone Implements of Japan* (1884) is well illustrated.

Japanning is the process of covering wood, metal, papier-maché, leather, etc., with varnish and other preparations, so as to harden the surface and make it more capable of resisting the effect of heat. This use of the term is not strictly correct, for the lacquer work of Japan is produced by different materials and a more elaborate process. (See LACQUER.) For black japan, asphaltum is mixed with gum, linseed oil, and turpentine, the mixture being applied in several coats, each of which is separately dried in a stove heated to from 140° to 300° F., and then rubbed down with powdered pumice-stone. For the commoner japanning fewer coats are applied, and mineral colours are substituted for asphaltum when

a black surface is not required. The process is also modified in the case of leather.

Japan Sea lies between Japan and Korea and Siberia. It extends some 500 m. from N. to S., and 600 m. from E. to W. It is almost tideless.

Japheth, according to Gen. 10:1-5, the second son of Noah, and the ancestor of a number of tribes who came to occupy 'the isles of the Gentiles.' Among his sons was Javan (i.e. Ionia, Greece), and his name was applied by the earlier philologists (in an indefinite way) to those peoples now called Indo-Germanic. See ETHNOLOGY, PHILOLOGY.

Japp, ALEXANDER HAY (1839-1905), Scottish author and editor, born at Dun, Forfarshire. He edited the *Sunday Magazine*, and was also sub-editor of the *Contemporary Review*. Among his varied works are *De Quincey's Life and Writings* (3rd ed. 1890); *Thoreau, his Life and Aims* (1878); *Hours in my Garden* (1894); a volume of verse, *The Circle of the Year and Dramatic Pictures* (1894); *Adam and Lilith*, and *Tales from the Rabbins and other Doctors* (1899); *Some Heresies Dealt with* (1899); *Her Part* (1900); and *Darwin as Ethical Thinker* (1901).

Japura. See YAPURA.

Jardine, SIR WILLIAM (1800-74), Scottish naturalist and author, was born in Edinburgh. He published (with Prideaux John Selby) *Illustrations of Ornithology* (1830); *The Ichthyology of Annandale* (1853); *Birds of Great Britain and Ireland* (post. 1876); and contributed the sections on birds and fishes to *The Naturalist's Library* (40 vols. 1843), of which he was editor.

Jargoon is a colourless, yellowish, smoky or gray zircon, obtained from Ceylon, and long supposed to be a worthless variety of diamond. It is found in worn pieces in river sands, and when well polished has a very fine lustre, more closely resembling that of the diamond than of any other gem.

Jarkent, tn., Central Asia, 60 m. W.N.W. of Kulja. Pop. (1897) 16,372.

Jarnac, tn., dep. Charente, France, on r. bk. of Charente, 7 m. by rail E. by s. of Cognac; is a wine and brandy centre. Here (March 13, 1569) the Duke of Anjou defeated the Huguenots under the Prince of Condé and Coligny. Pop. (1901) 4,911.

Jaro, tn., Leyte I., Philippines, 15 m. W. of Tacloban. Pop. (1898) 9,432.

Jaromierz, tn., Bohemia, on the Elbe, 68 m. E.N.E. of Prague; hassugar and jute factories. Pop. (1900) 6,671.

Jaroslaw, tn., Austrian crown land of Galicia, on the San, 20 m. by rail W.N.W. of Przemyśl; manufactures cloth and confectionery. Pop. (1900) 22,614.

Jaroslav. See YAROSLAV.

Jarrah (*Eucalyptus marginata*) is an Australasian tree of great economic value on account of the hardness and durability of its wood. The timber is imported into Britain for many purposes, among others for street paving.

Jarrow, munic. bor., Durham co., England, s. of the Tyne, 3 m. W.S.W. of S. Shields, the borough boundaries being contiguous. The church of St. Paul, which contains a *Crucifixion* by Vandyck, formerly belonged to the Benedictine monastery, founded in the 7th century, and famous as the scene of the labours of the Venerable Bede. Iron-ship building, engine works, iron foundries, and rolling mills employ over 7,000 persons, and there are large paper mills, chemical works, and other industries. Pop. (1901) 34,294. Jarrow Slake is a river-bay of the Tyne, 2 m. N.E. of Jarrow, partly occupied by docks, from which much coal is shipped.

Jaseur, a British first-class torpedo gunboat (810 tons) launched in 1892.

Jasher (R.V. JASHAR), THE BOOK OF, an ancient Hebrew collection of songs, no longer extant. It is mentioned twice in the Old Testament, both times in connection with the quotation of a lyrical passage. Thus, in Josh. 10:12, 13, the verses about the sun standing still upon Gibeon are cited from the book; while in 2 Sam. 1:18 it is named as the source of David's elegy on Saul and Jonathan. This is all the positive information we possess regarding it, but it is probably enough to warrant us in concluding that it was one of a number of similar collections containing the folk-songs or sagas of the Hebrew people, profane rather than sacred, and doomed, therefore, to gradual extinction as the national spirit became more and more associated with a strictly religious literature. The word *Jasher* or *Jashar* means 'upright,' and the Book of *Jasher* might therefore signify the book of the 'upright ones,' but it has been conjectured that *Jasher* may be a doublet of Israel (cf. *Jeshurun*). Or the word may be possibly connected with *shir*, 'to sing'; hence the 'Book of Songs.' During the middle ages there appeared three Jewish works, each claiming the title 'Book of *Jasher*,' and in 1751 an English publication purported to be a translation of it. See Ryle's *Canon of the Old Testament* (1892), 19 ff.; Holzinger's *Einleitung in den Hexateuch* (1893), 228 ff.

Jashpur, feudatory state in Chota Nagpur, Bengal, India, with an area of 1,963 sq. m., and a population in 1901 of 132,114.

Jasmin, JACQUES (1798-1864), Gascon barber-poet, a native of Agen, whose real name was Jacques Boé. His works were published as *Las Papillôtes* ('The Curl Papers'). His most attractive poems are short epic narratives, now serious, now gay, dealing with the lowly peasant life he knew so well, in his own Gascon dialect. They charm by their spontaneity and simplicity, and certainly belong to the most remarkable achievements of dialect literature. Jasmin is now generally acclaimed as one of the chief precursors of the *Félibrige* movement. His works were collected in one volume, with a French translation, at Paris, in 1860, and edited in four volumes by Royer d'Agen (1890), and in two volumes (1898). See Rabain's *Jasmin, sa Vie et ses Œuvres* (1867); De Montond's *Jasmin, Poète* (2nd ed. 1876); Andrieu's *Jasmin et son Œuvre* (1881); Cardaillac's *Propos Gascons: Jasmin* (1898). Longfellow introduced Jasmin to the English-speaking public by his beautiful version of *The Blind Girl of Castel-Cuillé* (set to music by S. Coleridge Taylor, 1901; revised version, 1902); and J. D. Craig translated 'Françoisnetto' in his *Poets and Poetry of the South of France* (1866). See, too, Smiles's *Jasmin—Barber, Poet, Philanthropist* (1891), and Marieton's *Jacques Jasmin* (1898).

Jasmine, a genus of shrubs belonging to the order Oleaceæ, of climbing habit. The flowers are salver-shaped, the corolla being white or yellow in colour, the stamens—two in number—included in the tube of the corolla, and the leaves usually pinnate. The winter-flowering yellow *J. nudiflorum* is one of the hardiest climbing shrubs, blooming long before its leaves begin to appear; the common white jasmine, or jessamine, *J. officinale*, has long been a favourite on account of its vigour and the delicacy of its fragrance; the yellow-flowering evergreen *J. revolutum* is also very fragrant; *J. sambac* is a beautiful evergreen stove twining plant, which bears fragrant white flowers during most of the year.

Jason, a British first-class torpedo gunboat (810 tons) launched in 1892. It is now employed in the training of officers and men in the Royal Naval Reserve at Gravesend. This ship-name seems to have been introduced on the capture of the French *Jason* by Anson in 1747.

Jason, the name of several persons in the Apocrypha, and of one in the New Testament. The

New Testament Jason was the host of Paul at Thessalonica (Acts 17: 5-9; cf. Rom. 16: 21), and, according to tradition, bishop of Tarsus. The most distinguished Jason in the Apocrypha is the degenerate high priest who superseded his brother, Onias III., by giving a bribe of 440 talents of silver to Antiochus Epiphanes. By a second gift Jason obtained authority to institute a 'place of exercise' in Jerusalem, and gained for the people the title of 'citizens of Antioch.' He also sent an expedition to Tyre in order to sacrifice to Hercules. In 172 B.C. he fêted Antiochus at Jerusalem. He was eventually unseated by his kinsman Menelaus, who proffered a more ample bribe for the position; and Jason having fled, died miserably in exile. See 2 Macc. 4, 5.



Jasmine (J. nudiflorum).

Jason. (1.) In ancient Greek legend was the leader of the Argonautic expedition; was bred up by the Centaur Cheiron. When he grew to manhood he demanded restitution of his father's kingdom from Pelias, who promised to give it him if he brought back the golden fleece from Colchis. This he undertook to do, and did with the help of the other heroes who had been his fellow-pupils with Cheiron. (See ARGONAUTÆ.) Jason returned to Iolcos with Medea, and found that Pelias had killed his father during his absence. But Medea persuaded his daughters to cut

him in pieces and boil him in a cauldron, so as to make him young again. His son Acastus expelled Jason and Medea from Iolcos, and they went to live at Corinth. After several happy years, when Jason wished to abandon Medea and marry Creusa, the king's daughter, Medea avenged herself by sending Creusa a poisoned robe, which burnt her to death, and by killing her own and Jason's children. Then, borne in a chariot drawn by winged dragons, she departed to Athens. (2.) A despot of Phæræ in Thessaly, about 375 B.C. He aimed at establishing a hegemony over the whole of Greece, and the conquest of Persia; but he was assassinated in 370 B.C.

Jasper is a coarse red variety of crypto-crystalline silica, and is essentially similar to flint, chert, and chalcedony. It is found usually in veins and cavities in igneous rocks. The red colour is due to oxide of iron, and is varied with yellow, white, gray, blue, black, and brown. Large pieces are polished and made into vases, boxes, and ornamental work. It is a secondary product which has resulted from the decomposition of the original minerals of the rock. Sometimes it has a banded pattern (striped jasper or ribbon jasper); at other times it is wavy, concentric, or highly irregular, with spots and flakes of different colours scattered through it. Egyptian jasper is a yellow-brown variety found on the banks of the Nile. Radiolarian cherts, which are gray, yellow, or red, and banded, are sometimes also known as jaspers.

Jassy, or IASI, tn., Roumania, 5 m. W. of riv. Pruth, 289 m. N.N.E. of Bucharest. It is the see of a Greek Orthodox metropolitan and of a Roman Catholic bishop, and possesses a university frequented by 660 students. The industries are of no importance, but the town has a lively trade in cereals, wine, and cattle. Down to 1859 it was the capital of Moldavia. Here in 1792 peace was concluded between Turkey and Russia. Alexander Ypsilanti here began the struggle for Greek independence in 1821. Pop. (1899) 78,067, of whom 39,440 were Jews.

Jaszapati, tn., Hungary, co. Jasz, 52 m. E. of Budapest. Pop. (1900) 10,864.

Jaszbereny, tn., Hungary, co. Jasz, 40 m. E. of Budapest; manufactures cloth and grows wine, and has a large trade in corn, cattle, and horses. Pop. (1900) 26,432.

Jasz-Nagykun-Szolnok, co. of Hungary, drained by the Tisza (Theiss); is flat and marshy. Area, 2,074 sq. m. Pop. (1900) 349,403. Chief tn. Szolnok.

Jātaka, the name of a series of legends dealing with the earlier births (550 in number) of the Buddha. They are the earliest source known for many of the fables which became part of the common folklore of India, and have subsequently passed into that of Western countries. *The Jātaka, with its Commentary*, was published in 7 vols. (Lond. 1877-97). See *Buddhist Birth Stories*, ed. Fausböll; Eng. trans. by Rhys Davids (1880). A new translation by Cowell and others appeared in 1895-1901.

Jativa, city, prov. Valencia, Spain, 35 m. S.W. of Valencia. An ancient city of the Romans, it was formerly famous for finest linen. It stands in a very fertile valley, and produces rice, fruit, wine, etc. Pop. (1900) 12,600.

Jats. See GYPSIES.

Jauer, tn., Prussian prov. of Silesia, 38 m. W. of Breslau. It has ancient churches, the palace of the former princes of Jauer, and a gymnasium. Jauer has a large trade in grain, and manufactures tobacco, leather, and woollens. Pop. (1900) 13,024.

Jaundice, or ICTERUS, is not itself a disease, but merely a symptom, which may arise from diverse pathological conditions. These may be classified into two groups—(1) hepatogenous, in which the jaundice follows a derangement of the biliary mechanism; and (2) hæmatogenous, in which the blood is at fault. Of hepatogenous causes, the most common is obstruction to the outflow of the bile from the liver to the intestine. This obstruction may result from the impaction of foreign bodies, such as gall-stones, in the bile ducts; from catarrh and swelling of the biliary passages or of the duodenum; or from pressure upon the ducts by morbid growths in the liver itself or in neighbouring organs. The retained bile is absorbed into the blood, and, being carried into the general circulation, produces that characteristic yellow pigmentation of the tissues which is known as icterus. The fluids of the body, the urine, the sweat, and sometimes even the tears have the characteristic discoloration; while the stools, from deprivation of their normal supply of bile, are of a pale drab or slate-gray hue, and, on account of putrefactive changes, acquire an extremely offensive odour. The absence or diminution of the bile also prevents the due assimilation of the fatty portions of the food. In nearly all cases the frequency of the pulse is diminished, and, in many, pruritus, with intolerable itching, is present, being sometimes associated with the development of boils. In the more

protracted forms of jaundice, and especially in those resulting from malignant disease, hæmorrhages of a purpuric type are common. The appetite is always impaired.

Of the hæmatogenous forms of jaundice, those arising from such diseases as yellow fever and malaria are the more common. They appear to depend upon a destruction of the red blood corpuscles so rapid that the blood-glands cannot get rid of the excessive blood pigment, which is consequently deposited in the tissues in the form of bilirubin. Snake virus acts in a similar way. A rare form of non-obstructive jaundice accompanies acute yellow atrophy of the liver. This disease is sometimes called malignant jaundice. Its pathology is obscure; but all cases display great shrinkage in the bulk of the liver, and rapid disintegration of the hepatic cells. Death in a few hours, or at most in a few days, has invariably followed malignant jaundice.

Treatment.—Where an obstruction exists, efforts should be made to remove it. Rest is important, and counter-irritation over the liver and biliary passages is of use in removing congestion and catarrhal swelling. Should gall-stones be present, their passage should be encouraged, and cholagogue laxatives (i.e. those which increase the flow of bile) are generally serviceable. Of these, mercury, podophyllin, rhubarb, iridin, and euonymin are most beneficial. Diuretics should also be given as well as diaphoretics, which tend to relieve the intolerable itching. As far as possible, alcohol, sugar, starch, and fat should be eliminated from the diet, which ought to consist of nutritious but simple, non-stimulating food, such as soups and milk. In more chronic cases, gentle exercise, change of scene, Carlsbad waters, and warm baths are of service. In such cases lemon juice has proved a valuable diuretic; and the administration of ox gall by the mouth, as recommended by Dr. Harley, promotes the assimilation of food. When the jaundice results from external pressure upon the ducts, or from prolonged impaction of gall-stones, an operation may be necessary.

Jaunpur, munic. tn., and cap. of a dist. of the same name, United Provs., India, on the l. bk. of the Gumti, 37 m. N.W. of Benares. The former capital of a Mohammedan kingdom, it has mosques, tombs, the fort, and a fine 16th-century bridge. It is famous for its perfumes. Pop. (1901) 42,771. The district has an area of 1,550 sq. m., and a population (1901) of 1,202,920.

Jauréguiberry, a French first-class battleship (11,824 tons)

launched in 1893; named after Admiral Jean Bernard Jauréguiberry (1815-87), who served on shore with distinction during the Franco-German war (1870-1).

Jauréguiberry, JEAN BERNARD (1815-87), French admiral, born at Bayonne; served in the Crimean war and in China. During the Franco-German war he distinguished himself by his skilful handling of troops at Orleans and at Le Mans. He was minister of marine from 1879-80 and 1882-3.

Jaurès, JEAN (1859), French statesman, born at Castres, dep. Tarn; became professor of philosophy at the University of Toulouse (1883), but in 1885 was elected to the Chamber of Deputies. In 1892 he championed the cause of the workmen in the Carmaux strike, and in the following year became the leader of the Socialist group in the Chamber. He was also an earnest defender of Dreyfus. In 1902 Jaurès, who is one of the most eloquent of living Frenchmen, was elected vice-president of the Chamber. He has written *Histoire Socialiste, 1789-1900* (1901).

Java, isl. of Dutch E. Indies, the most populous, though not the largest, in the E. Indies. It is long (600 m.) and narrow (45 to 120 m.), and stretches E. and W., with a steep rocky coast to the Indian Ocean on the S., but low, flat shores to the Java Sea on the N. It lies on the great volcanic girdle that fences the W. side of the Pacific, and itself possesses several active, and a still larger number of extinct, volcanoes, such as Smeru (12,028 ft.), Sumbing (10,965 ft.), Slamet or Gedeh (11,244 ft.), and Merapi (9,469 ft.). These mountains alternate with low plains (mostly in N.) and hilly tablelands (mostly in S.), and are the cause of the rivers being generally short and of little value for navigation. The climate is tropical, hot, and moist, especially on the lowlands, but somewhat cooler in the mountainous parts. At Batavia the thermometer ranges annually only between 77° and 79° F., and the water of the adjacent seas stands generally at from 82° to 84° F. The rains are brought by N.W. winds between November and March. Vegetation is luxuriant up to about 9,000 ft. Java has no minerals, except a little coal, but she produces some petroleum. Her wealth lies in the exceptional fertility of her soil; and yet of the total area only about two-fifths is cultivated. The chief crops of commercial value, mostly grown on government and private plantations, or by the natives in return for prearranged government prices, are sugar (some

1,100,000 tons annually, tobacco, cinchona and quinine, coffee, indigo, rice, tea, cocoa, nutmegs, and pepper. Besides these, tin (from Banca and Billiton), arrack, hides, and timber are also exported. The exports (1904) were valued at over 25 millions sterling, of which some 80 per cent. went to the Netherlands. The imports (1904) were about 18 millions sterling. The principal ports are Batavia (*i.e.* Tanjong Priok), Surabaya, and Surakarta. The insular trade is largely carried on by the Royal (Dutch) Steam Packet Co. The area is about 48,600 sq. m.; and the population (1900) 28,384,731, of whom 62,477 were Europeans, and 298,490 Chinese, Arabs, etc. The native population, of the Malay stock, but distinguished as Javanese, Sundanese, and Madurese, are mostly agriculturists, and profess Islamism. The trading is chiefly in the hands of Chinese and Arabs. From 1830 to 1870 (and even later as regards coffee)

island, under the governorship of Sir Stamford Raffles, who wrote a *History of Java* (2nd ed. 1830). It was restored to the Dutch in 1817. The standard works Veth's *Java* (2nd ed. 1896-1903). See also Van der Lith's article 'Java,' in *Encyklopädie van Nederlandsch Indië* (1895); E. Metzger's 'Notes on Dutch E. Indies' in *Scot. Geog. Mag.* (1888); and the lighter works—E. R. Scidmore's *Java* (1898), A. de Wit's *Facts and Fancies about Java* (new ed. 1905), W. B. Worsfold's *A Visit to Java* (1893), Van Dorp's *Officieele Reisgids* (1897), and Louw's *De Java-Oorlog van 1825-30* (1894-1904).

Java Sea, the sea which lies between Java and Borneo, and reaches from Sumatra on the w. to Celebes on the e. It is also known as the Sunda Sea.

Javae, tn., prov. Alicante, Spain, on Mediterranean, 3 m. S.E. of Denia. Produces muscatel raisins, mandarin oranges, lemons, and wine. Pop. (1900) 6,606.



Java.

the island was governed under the Van den Bosch or 'culture' system of exploiting native labour for the profit of the mother country; but since about 1880 (nominally 1870) private competition has been allowed greater scope. For administrative purposes Madura is associated with Java. The natives are ruled by their own chiefs, under European residents and controllers. The supreme executive is in the hands of the governor-general, who is appointed by the queen of the Netherlands. A scheme of local government was inaugurated in the principal towns in Java in 1905. All foreigners are now exempt from service in, or contribution to the funds of, the *Schutterij*, or militia. From India, Java derived her earliest civilization and religion. Buddhism came first, then Sivaism, and both struggled for supremacy, a compromise resulting. The famous ruins at Boro Budur exhibit evidences of both faiths. From 1811 to 1816 the British held the

Jaworow, tn., Austrian prov. of Galicia, 30 m. w. by N. ofemberg. Its chief industries are pottery-making, brewing, and distilling. The castle has renowned Italian gardens. Pop. (1900) 10,090.

Jaworzno, tn., Galicia, Austria, 30 m. W.N.W. of Cracow; has coal mines, petroleum wells, and zinc-smelting works. Pop. (1900) 9,206.

Jaxartes. See SYR DARIA.

Jay (*Garrulus glandarius*), a handsome member of the family Corvidæ. In Ireland and Scotland the jay is local, but it is distributed throughout the wooded parts of England and Wales, being, however, persecuted everywhere by gamekeepers. Its natural food consists of worms, insects, nuts, and berries, but it also eats the eggs and young of other birds. The head bears a whitish crest, each feather being tipped with black; the body is chiefly brown above and brownish white below; but the tail is black, the wing quills brown or

black, and the wing coverts barred with black, white, and pale blue. These last-named feathers are much used in the



Jay.

manufacture of artificial flies for fishing. The bird is about the size of the jackdaw, and is shy and wary in its habits. The natural cry is a harsh screech, but the birds have considerable power of imitation. The genus *Garrulus* is represented throughout the Old World by a considerable number of species, and is replaced in the New World by the blue jays of the genus *Cyanocitta* in N. America, and by the genus *Cyanocorax* in the south, both having more blue about them than the common jay. The habits of all the species are very similar, and all have an erectile crest and short wings.

Jay, HARRIETT, authoress and actress, was practically adopted by Robert Buchanan, who married her elder sister. She published anonymously *The Queen of Connaught* (1875), a novel; collaborated with Buchanan in the production of *The Shopwalker* and *Two Little Maids from School*; appeared in his poetical play *The Bride of Love*, and has taken leading parts in other dramas. She has published (1903) an interesting *Memoir of Robert Buchanan*, as also the novels *Madge Dunraven* (1879), *A Marriage of Convenience* (1885), and *Two Men and a Maid* (1881).

Jay, JOHN (1745-1829), American statesman and jurist, born at New York City; was admitted to the bar in 1768, and elected (1774-5) to the first and second Continental congresses, and to various other conventions. He drafted addresses to the people of Great Britain and Canada, and prepared the constitution of New York State (1777), being afterwards appointed judge. Returned to Congress (1778), he was elected its president, and (1779) appointed minister to Spain. In 1782 he did satisfactory work on the Peace Commission at Paris, was secretary for foreign affairs (1784-9), favoured the adoption of the national constitution (1789), and was made chief-justice of the

supreme court after the organization of the Federal government. In 1794 the 'Jay treaty' was concluded, and the reciprocity of inland trade was established between the United States and British N. America. He was governor of New York (1795-1801). See *Life* by Pellew (1890), Whitelocke (1887), and W. Jay (1833).

Jay, WILLIAM (1789-1858), American abolitionist, was born in New York City; was a judge (1818-42), a founder of the American Bible Society (1815), a prominent member of the American Anti-Slavery Society, and an earnest opponent of war. He published *Life and Writings of John Jay* (1833).

Jay, WILLIAM (1769-1853), English Congregational minister and author, born at Tisbury, Wiltshire; was called to the pastorate of Argyle Chapel at Bath (1791), and there remained until his death. His chief works are *Morning Exercises* (1829); *Evening Exercises* (1831); *The Christian Contemplated* (1826); *Lectures on Female Scripture Characters* (1854).

Jayadeva, a Hindu poet of the 12th century, whose religious drama, *Gitagovinta*, has been compared with the *Song of Solomon*. Both poems are on parallel lines, and have been mystically interpreted. There is an English translation by Sir E. Arnold (1881), and a partial translation by Sir W. Jones (1799).

Jazyges, a Sarmatian tribe occupying a district near the Black Sea. A portion of the Jazyges moved westwards and settled in the centre of modern Hungary in the 1st century A.D. See *SARMATIA*.

Jeaffreson, JOHN CORDY (1831-1901), English author and novelist, born at Framlingham in Suffolk; led the life of a professional man of letters, writing successful novels, such as *Olive Blake's Good Work* (1862), *Live it Down* (1863), and *Not Dead Yet* (1864). But his most important works were biographical—e.g. *The Real Lord Byron* (1883), *The Real Shelley* (1885), and *Lady Hamilton and Lord Nelson* (new ed. 1897). He did good work for the Historical MSS. Commission. He wrote some amusing books—*About Doctors* (1860), *About the Clergy* (1870), *About Lawyers* (1867), and *Brides and Bridals* (1872). See his *Book of Recollections* (1894).

Jeanne d'Arc. See *JOAN OF ARC*.

Jeannette, bor., Westmoreland co., Pennsylvania, U.S.A., 4 m. W.N.W. of Greensburg; has glass and chemical works. Pop. (1900) 5,865.

Jebail, or *JEBEIL*, coast tn., Syria, 18 m. N.N.E. of Beirut, and near Mt. Lebanon. It has old

walls and a cyclopean citadel. It is said to be the ancient Byblos.

Jebb, SIR RICHARD CLAVERHOUSE (1841), Greek scholar, born at Dundee. In 1875 he was appointed to the chair of Greek at Glasgow, but in 1889 removed to Cambridge as regius professor of Greek. He was one of the organizers of the inter-collegiate classical lectures at Cambridge, and helped to found the Cambridge Philological Society, as well as the British School of Archaeology at Athens. Since 1891 he has been M.P. (Unionist) for Cambridge University. He has published valuable editions of and works on the classics—*The Characters of Theophrastus* (1870), *Attic Orators* (1876; 2nd ed. 1903), *A Primer of Greek Literature* (1877), *Modern Greece* (1880), *Introduction to Homer* (1887), *Growth and Influence of Greek Poetry* (1893), and *Bacchylides* (1905). He also published *Bentley* (English Men of Letters, 1882), and *Humanism in Education* (1899). His edition of Sophocles, with critical notes, commentary, and translation, issued in seven volumes (1883-96), is the standard edition.

Jebel Shammar, SHUMMER, or SHOMER, one of the provinces of Nejd, Central Arabia, between 26° and 28° N. lat. It is crossed by two granite ridges, the Jebel Shammar (6,000 ft.) and Jebel Selma. Cap. Hail. Much of the land is desert, but the valleys are fertile. Pop. about 150,000.

Jedburgh, par. of Roxburghshire, Scotland, co. tn. and royal bur., on the Jed, 56 m. S.E. of Edinburgh. It has an abbey founded by David I. in 1118. A castle, built about the 12th century, was destroyed in 1409. The well-known 'Jethart justice' ('hang a man first, try him after') indicates the rough ethics of the lawless Borders. The abbey suffered greatly in the English raids, but is still well preserved, and is said to be the most perfect example of Saxon and early Gothic in Scotland; the choir is early Norman. Jedburgh was one of the first towns to begin the woollen industry, still its principal manufacture. There are also a brewery and a tannery. Birthplace of Sir David Brewster (1781) and Mary Somerville (1780). Pop. (1901)—tn. 3,136; par. 4,533.

Jedda, JEDDAH, or JIDDAH, seapt. in Hejaz, Arabia, on the Red Sea, 60 m. W. of Mecca. The harbour is the port of disembarkation of pilgrims for Mecca, more than 50,000 passing through the port yearly. The exports (£831,000 in 1901) are mother-of-pearl, hides, coffee, carpets, and gum arabic; imports, £792,600. The town was bombarded by the British in 1858. Pop. estimated at 30,000.

Jeddo. See *TOKYO*.

Jefferies, JOHN RICHARD (1848-87), English novelist and naturalist, born at Coate Farm, near Swindon, Wiltshire. From 1866-7 he acted as reporter to the *North Wiltshire Herald*. Three long letters which he contributed to the *Times* in 1872 attracted some attention. In 1878, however, his *Gamekeeper at Home* secured for him a high place as a student of nature, with rare powers of observation and description. Among his other works were *Wild Life in a Southern County*, and *The Amateur Poacher* (1879); *Round about a Great Estate*, and *Hodge and his Masters* (1880); *Wood Magic* (1881); *The Story of my Heart*, and *Nature near London* (1883); *Red Deer*, and *The Life of the Fields* (1884); *After London*, and *The Open Air* (1885). After his death, *Field and Hedgerow* was issued, edited by his widow (1889); and *Toilers of the Field*, edited by C. J. Longman (1892). See *Eulogy* (1888) by Sir W. Besant; *R. J., a Study*, by H. S. Salt (1894).

Jefferson, riv., U.S.A., one of the three head branches of the Missouri, rises in S. Montana, and after a circuitous course joins the Madison and Gallatin at the foot of the Gallatin valley to form the Missouri. Its length is 150 m., and its drainage area 9,400 sq. m.

Jefferson, JOSEPH (1829-1905), American comedian, born at Philadelphia; achieved a triumph at New York as Asa Trenchard in *Our American Cousin* (1858), which, however, was surpassed by his great rôle of *Rip van Winkle*, first produced at Washington in 1859. This play in an altered form had a great success in London in 1865. Among his other parts are Caleb Plummer in *The Cricket on the Hearth*, and Bob Acres in *The Rivals*. See his *Autobiography* (1889).

Jefferson, THOMAS (1743-1826), third president of the United States, was born at Shadwell, Virginia, and was admitted to the bar (1767). A member of the famous congress of representatives of the various colonies at Philadelphia (1776), he was the author of the draft of the Declaration of Independence made by that body (July 4, 1776). A strong believer in the supremacy of the individual states, Jefferson framed the new constitution of his native state, and revised its law code (1776-8). He succeeded Patrick Henry as governor of the state (1779-81), and was able, though a civilian, to meet the Cornwallis invasion which occurred during his tenure of office. Returning to the field of national politics (1783), he was sent as commercial agent and ambassador to Paris (1774-9). He was

next called to be secretary of state in Washington's cabinet (1789-94). In 1797 he became vice-president under John Adams, and in 1801 he overthrew the hitherto dominant Federalists, and was elected president. In 1805 he was elected for a second term as president. During his last years he founded the University of Virginia. His *Works* were edited by P. L. Ford (10 vols. 1892-9). See Morse's *Life of Jefferson* (1883), and Randall (1888).

Jefferson City, city, Missouri, U.S.A., co. seat of Cole co., and cap. of the state, on the Missouri, 107 m. w. of St. Louis. It manufactures agricultural implements, boots and shoes, saddletrees, and clothing. Pop. (1900) 9,664.

Jeffersonville, city, Indiana, U.S.A., co. seat of Clark co., on the Ohio, opposite Louisville. It makes river steamboats and railway cars. Pop. (1900) 10,774.

Jeffrey, FRANCIS JEFFREY, LORD (1773-1850), Scottish judge and literary critic, born at Edinburgh. He was admitted to the bar (1794), but gave his energies to literature, especially as a contributor to the *Edinburgh Review*. Within a year after the issue of the first number (1802) Jeffrey got full control as editor. The *Review* became the leader of public opinion, and the most dreaded of critical censors. Jeffrey's style of criticism was incisive, and brought him much ill-feeling. It has been called flippant and superficial by some, but it was uniformly honest and sincere. The conduct of the *Review*—Jeffrey himself did not write the article to which the poet took exception—drew from Byron his satirical piece, *English Bards and Scotch Reviewers*. It involved Jeffrey, too, in a challenge to a duel with Moore (1806), checked by the police in time, and brought about a coldness with Wordsworth and Southey, the Lake poets having been subjected to repeated attacks. Becoming dean of faculty (1829), in the October following he resigned the editorship of the *Review* to Macvey Napier. Jeffrey's appointment, in 1830, as lord advocate took him to London, and into the fashionable society there. He had a share in the passing of the Reform Bill (1832), and was one of the two members elected for Edinburgh under the new régime. Promoted to the bench of the Outer House of the Court of Session in 1834, he was called to the First Division in 1842. He wrote an essay on 'Beauty' in the *Encyclopædia Britannica*. See Carlyle's *Reminiscences* (vol. ii. 1881), Macvey Napier's *Correspondence* (1878), Horner's *Memoirs* (1853), Moore's

Diaries (1856), Reid's *Life of Sydney Smith* (1884), and Cockburn's *Life of Jeffrey* (1874).

Jeffreys of Wem, GEORGE JEFFREYS, LORD (1648-89), Lord High Chancellor of England, born at Acton, near Wrexham, Denbighshire. He was called to the bar (1668), appointed common serjeant of the City of London (1671), recorder of the city (1678), and chief-justice of Chester (1680). He prosecuted Lord William Russell for his share in the Rye House plot, and presided at the trial of Algernon Sidney. In July 1685, after Sedgemoor, he conducted the 'Bloody Assize,' when 320 executions for high treason were ordered by him. On becoming Lord Chancellor (1685) he endeavoured to rule the House of Lords; and, as James II.'s right hand, he secured the committal of the seven bishops to the Tower (1688). Like the king himself, Jeffreys had to flee (1688); but being discovered in disguise at Wapping, he was arrested, and was placed in the Tower, where he died. See Campbell's *Lord Chancellors* (1857), Foss's *Judges of England* (1864), and Woolrych's *Life of Judge Jeffreys* (1827).

Jehangir, or SALIM NUREDDIN MOHAMMED (1569-1627), ascended the throne of Delhi and Agra on the death of his father, Akbar, in 1605. Before his father's death he had rebelled against him, and had made an unsuccessful attempt to seize Agra. He had also brought about the death of Abul Fazl, his father's friend and biographer. The principal events of his reign were his wars in the Deccan and Udaipur, and the loss of Kandahar. Jehangir was a confirmed drunkard, and gladly made over the reins of government to his celebrated queen, Nurmahal. The last years of his reign were embittered by rebellions of his generals and his children. Jehangir was visited at Delhi and Agra by an ambassador from England—viz. Sir Thomas Roe—and also by Captain Hawkins, whose memoirs shed invaluable light on his personal character, his court, and the condition of Upper India. To these we must add *Tazak-i-Jehangiri*, or memoirs written by himself, which are as frank and almost as entertaining as those of Baber.

Jehlam. See JHELUM.

Jehoiachin, called also JECANIAH or CONIAH, king of Judah, was the son and successor of Jehoiakim. After a reign of three months (597 B.C.) he was dispossessed by Nebuchadnezzar and carried to Babylon. Here he was kept in harsh confinement for thirty-seven years, but was

released by Evil-merodach. See 2 Kings 24:6-16, 25:27 f.; 2 Chron. 36.

Jehoiada, a high priest of Judah during the reigns of Ahaziah, Athaliah, and Joash. He planned the *coup d'état* by which Athaliah, the usurping queen-mother, was deposed and slain, and practically governed the country during the minority of Joash. He likewise suppressed Baal-worship, renovated the temple and restored its services. (See 2 Kings 11, 12; 2 Chron. 23, 24.) The name Jehoiada was also borne by a high priest in David's time—the father of Benaiah, captain of the king's bodyguard.

Jehoiakim, or ELIAKIM, king of Judah (608-597 B.C.), was the son of Josiah, and the successor of his brother Jehoahaz. He began his reign as the vassal of Necho, king of Egypt; but about 605 Nebuchadnezzar of Babylon, who had defeated Necho at Carchemish, laid siege to Jerusalem, and shortly reduced it, carrying away many captives, among whom was Daniel. Jehoiakim was reinstated; but his revolt three years later was the signal for a renewed attack by the Babylonian vassals, during which he was slain, and Jerusalem eventually taken and plundered. See JEHOIACHIN; and 2 Kings 23:34 to 24:5; 2 Chron. 36:4-8.

Jehol. See CH'ENG-TE-FU.

Jehoshaphat, VALLEY OF (Joel 3:2), identified with the gorge N.E. of Jerusalem, between the Mount of the Temple and the Mount of Olives, the dry bed of the brook Kedron forming its lower part. The garden of Gethsemane and the village of Siloam are in the valley. Some hold that Joel referred to the valley of Berachah, in which Jehoshaphat gained a memorable victory (2 Chron. 20:26).

Jehoshaphat, king of Judah (c. 876-851 B.C.), was the son and successor of Asa. A just and energetic ruler and a truly pious man, he yet made an alliance with the house of Omri, and cemented it by the marriage of his son Jehoram with Athaliah, daughter of Ahab and Jezebel, committing thereby the grand mistake of his reign. With Ahab he attacked Ramoth-gilead, then a Syrian stronghold, and barely escaped with his life. He afterwards (with Ahaziah) made an unsuccessful attempt to develop the foreign commerce of his country. Jehoshaphat's expedition against Moab, Ammon, etc., was attended with a better result; but a second (with Jehoram), against Moab, was again a fiasco, as related on the Moabite stone. See 1 Kings 15:24 ff.; 2 Kings 3; 2 Chron. 17-20.



Species of Jelly-fish.

1. Aurelia. 2. Physalia, or Portuguese man-of-war. 3. Chrysaora. 4, 5. Sarsia. 6. Hydra-tuba on rock. 7. Development of Aurelia : 1. ciliated embryo; 2. hydra-tuba; 3. strobilla stage; 4. ephyra developing and separating.

Jehovah, the personal name of the God of Israel. From Ex. 3:13 f. and 6:3 it would seem that the name was first revealed to Moses, but there are evidences of its previous use—e.g. Gen. 4:26, 'Then began men to call upon the name of the LORD' (Jehovah); and some scholars believe that Moses found the name during his sojourn among the Midianites (Kenites), and that it was current in the Sinaitic peninsula before the exodus. In that case the special revelation to Moses would mean only the bringing of the name Jehovah into a particular relationship with Israel; so that, as has been said, the primary and distinctive work of Moses was the declaration that Jehovah was Israel's God, and Israel Jehovah's peculiar people. The modern pronunciation of the name is commonly regarded as without justification. In the original unpointed Hebrew the word is JHVH, known as the tetragrammaton; but as by the time of the Massoretes it was deemed too sacred for utterance, the original vocalization (whatever it was) was replaced by the vowels of the divine title 'ādōnāi (Adonai), thus Jehovah—the short *e* taking the place of the fugitive *ā*. From the connection of the word with *hajah* or *havah*, 'to be,' as given in Ex. 3:14, the tetragrammaton may be interpreted as the third person imperfect of that verb—i.e. *jahveh*, corresponding to the first person *ehyeh*, 'I am,' or rather 'I will be,' and therefore meaning 'He (who) will be (deliverer, etc.).' The forms given in some of the Christian fathers, *Iae*, *Iabe*, *Iaoue*, etc. (see Deissmann's *Bible Studies*, 318 f.), seem to corroborate the theory that the original name was *Jahveh* or *Jahweh*; and this appears also to explain the shorter form *Jah*, either occurring independently (Ps. 68:4) or in combination—*Isaiah*, *Jeremiah*, etc. But the whole theory is contested by a recent writer in the *Jewish Quarterly Review* (October 1902), who argues that the original form was *Jah*, *v* or *w* being the sign of the nominative (*Jahu*), and the final *h* being paragogic. This would throw light on such common longer name-forms as *Jirnjahu* for *Jeremiah*. The Septuagint translates JHVH by *Kurios*, 'Lord;' the English version usually by LORD in small capitals. See Driver in *Studia Biblica* (1883); Schultz's *Old Testament Theology*, ii. 131-139 (1892), and lit. to ch. viii.

Jehu, king of Israel (842-815 B.C.). While as yet chief commander of the army, and during the illness of Jehoram at Jezreel, Jehu was anointed king by an agent of Elisha, and commanded

to smite the idolatrous house of Omri. By nature a merciless and unscrupulous zealot, he far exceeded his commission, and waded to the throne through blood. Jehoram, Ahaziah (king of Judah), Jezebel, seventy descendants of the royal house of Israel, and finally a large course of Baal-worshippers, perished in turn at his command. His name is found on a tablet of Shalmaneser II. (c. 840 B.C.), according to which he paid tribute to Assyria. See 2 Kings 9 f.

Jeisk. See YEISK.

Jejunum is that part of the small intestine which lies between the duodenum and the ileum. Its mucous membrane, especially in the upper part, displays folds of mucous and sub-mucous tissue known as *valvulae conniventes*, which increase the absorbent surface of the intestine and delay the passage of the food. Its internal surface has also well-marked villi—i.e. innumerable little projections, which absorb chyle and give the intestine a velvety appearance. The mucous coat of the jejunum is liberally supplied with lymph follicles, of which some form *solitary glands*, while others are aggregated into *Peyer's patches*. Little difference is to be noted between the jejunum and the ileum, except that the walls of the former are somewhat thicker, and its diameter is rather greater.

Jejuy, riv. See PARAGUAY.

Jelalabad. See JALALABAD.

Jelatma. See YELATMA.

Jeletz. See ELETZ.

Jelf, RICHARD WILLIAM (1798-1871), English theologian, born at Oaklands, Gloucestershire; became tutor (1826) to Prince George of Cumberland, afterwards king of Hanover; principal of King's College, London, in 1844, and in the same year delivered the Bampton Lectures, 'An Inquiry into the Means of Grace.' He published a volume of *Sermons* (1835).

Jelf, WILLIAM EDWARD (1811-75), English theologian and classical scholar, born at Oaklands, Gloucestershire, brother of R. W. Jelf, delivered the Bampton Lectures for 1857, on 'The Christian Faith.' He subsequently held livings at Carleton, Yorkshire, and at Caerleon in Wales. His *Greek Grammar* (1842-5) is his most important work.

Jellachich, JOSEPH, BARON (1801-59), Austrian general, was born at Peterwardein; appointed (1848) Ban of Croatia, Slavonia, and Dalmatia. In crushing the Hungarian rebellion of 1848-9 he took an important part, and in 1853 was appointed commander-in-chief of the troops raised to cope with the disturbances in Montenegro.

Jelly is a peculiar state of matter in which a liquid is solidified by the addition of a comparatively small amount of some colloid substance such as gelatin or silicic acid. Jellies do not flow, possess the incompressibility of liquids, and though elastic to torsional or tensile stresses, exhibit the property but to a small extent. The best-known jellies are those composed of gelatin and water, with more or less flavouring matter, that are used as articles of food or confectionery; the vegetable jellies, such as that of agar-agar, used as culture-media in bacteriology; and the purely inorganic jellies, such as those formed when solutions of silicic acid are allowed to stand.

Jelly-fish, a term which should be limited to the members of the sub-class Scyphomedusæ, of the Scyphozoa (see CœLENTERA), which includes the true medusæ, or jelly-fish. The word is also applied (a) to the medusoids or swimming-bells of the Hydrozoa; (b) to the Siphonophores, such as the Portuguese man-of-war, which are colonial organisms; and occasionally (c) to the Ctenophores. Of the true jelly-fish a very familiar example is *Aurelia aurila*, often thrown up in thousands on the beach in August. These flattened dying examples differ in several respects from the living creature as found in the open sea. In it the body consists of a strongly-curved 'umbrella' of jelly, whose margin is fringed with tentacles. Through the translucent jelly there radiate blue canals, sixteen in number, eight being branched and eight unbranched. Very conspicuous also are the four horseshoe-shaped reproductive organs. On the under surface is the mouth, in the centre of four frilled lips, which bear stinging threads. The umbrella contains muscular fibres, and the jelly-fish swims by alternately expanding and contracting these. While *Aurelia* seldom exceeds eight inches in diameter in British seas, other jelly-fish are often enormous, a diameter of seven feet having been described in some cases. In such forms the stinging cells are very powerful. The special interest of *Aurelia* is its development. From the fertilized egg there develops a free-swimming larva (planula), which ultimately settles down, buds out tentacles at one end, and forms what is known as a *hydra-tuba*, one-eighth to one-half inch in height. Later in the season this begins to show signs of transverse fission, elongating and forming the *strobilia* stage, in which it resembles a pile of saucers. The top saucer falls off and floats away as an *ephyra*, and the *ephyra* grows into an

adult jelly-fish. The process is repeated, so that from the tiny hydra-tuba a number of huge jelly-fish are formed. A similar development occurs in many other jelly-fish, but in some the adult jelly-fish develops directly from the fertilized egg without the intervention of a sessile larval stage. In others—e.g. *Lucernaria*—there is no jelly-fish stage, and the animal remains permanently at the larval level. In all probability the jelly-fish are most nearly related to the sea-anemones.

Jemappes, tn., Belgium, prov. Hainaut, 3 m. w. of Mons; famous for the victory of the French over the Austrians in 1792. It has glass works, and in its vicinity are extensive coal mines. Pop. (1900) 12,778.

Jena, tn., Germany, grand-duchy of Saxe-Weimar, on l. bk. of the Saale, 14 m. by rail s.e. of Weimar; the seat of a university founded in 1558, and attended by some 850 students. Among the distinguished names associated with the university and the town are those of Goethe, Schiller, Oken, Fichte, Arndt, and Alexander von Humboldt. The former residence (1672-90) of the dukes of Saxe-Jena contains the scientific collections of the university. Here is the supreme law court of the Thuringian states. At Jena Napoleon defeated the Prussians in 1806. There is a library in books, and mathematical instruments (lenses, etc.) and pianos are made. Lichtenhainer beer is brewed in the neighbourhood. Pop. (1900) 20,686.

Jenatsch, GEORG (1596-1639), patriot leader in the Thirty Years' war, born in the Engadine; drove the Austrians out of the Grisons with French aid, and then expelled the French. He then became governor of Valtellina, but was assassinated at Coire at a banquet. He is the hero of a novel by Conrad F. Meyer (1876).

Jenghiz Khan, or CHINGIZ KHAN (1162-1227), Mongol conqueror, whose real name was Temujin, was born beside the river Onon, in the north of Mongolia. After a stormy youth, he won his first important success when past forty years of age, in 1203, by subduing the Keraites, or Torgud (Torgut) Mongols. This was followed by the subjugation of the Turkish Naimans (in W. Siberia) and Ugurs (in Central Asia), the Chinese state of the Hia or Hea (1208-12), and the Tartar state of Kin in N. China (1212-14). Then he turned his attention to the far west, and after reducing the realm of the Mongol Kara-Khitai (in E. Turkestan), he overran (1218-24) Khwarezm (i.e. Khiva, Samarkand, and Bokhara) and Khorassan, destroying the three

cities just named, as well as Merv, Nishapur, and Herat, and inflicting death and torture upon thousands who dared to oppose him. Then, whilst one lieutenant invaded India, two others proceeded through the Caucasus as far west as the Crimea in Russia. Meanwhile another Mongol general was completing the conquest of N. China. See, further, MONGOLS; also Sir H. H. Howorth's *Hist. of the Mongols* (1876-88); Sir R. K. Douglas's *Life of Jenghiz Khan* (1877); and Erdmann's *Temudschin der Uner-schütterliche* (1862).

Jenissei. See YENESEI.

Jenkin, HENRY CHARLES FLEEMING (1833-85), English engineer, was born near Dungeness, Sussex; was appointed (1865) to the professorship of engineering at University College, London, and subsequently (1868) at Edinburgh University. In 1873 he published a valuable manual on *Magnetism and Electricity*. Among his inventions was a system of transport by electricity entitled 'telpherage,' but it was never fully completed. See Memoir by R. L. Stevenson prefixed to Jenkin's *Miscellaneous Papers* (1887).

Jenkinson, ANTHONY (d. 1611), English sea-captain and traveller. As agent of the Muscovy Company (1557), he visited the Czar at Moscow, and penetrated to Bokhara in 1558-9, and on a subsequent journey was commissioned to establish a trade with Persia. He also obtained for his company the monopoly of the White Sea trade (1567). See *Early Voyages and Travels in Russia and Persia* (Hakluyt Soc., 1886), and biographical introduction by E. D. Morgan.

Jenner, EDWARD (1749-1823), the discoverer of vaccination, was born at Berkeley in Gloucestershire; was a pupil of John Hunter. Beginning, in 1775, his study of the popular belief that cow-pox is antagonistic to smallpox, he pursued it until 1796, when he satisfied himself of its truth. But the general acceptance of vaccination was hindered by the unscientific methods of many who adopted its practice. Opposition was also offered by scientists of repute. Nevertheless, in spite of this the value of the discovery became widely known in England, throughout Europe, and in the United States. Parliament made a grant of £10,000 to Jenner (1802), and another of £20,000 in 1806. Jenner spent his later years at Berkeley, engaged in professional work, and in elaborating his discovery. It is difficult to realize the services of Jenner to humanity. Small-pox is now a rare disease; before his time it was a universal scourge.

So terrible and so universal was the disease that inoculation was resorted to in the hope that the patient might suffer, at a convenient time, only a mild form of an affliction which was regarded as nearly inevitable. The discovery of vaccination was the precursor of the bacteriological pathology and therapy of the 19th century. Yet it was only with great difficulty that Jenner's views won general acceptance; indeed, the opposition to them has not died out yet in England. His works include *An Inquiry into the Causes and Effects of the Variola Vaccina* (1798); *On the Influence of Artificial Eruptions in Certain Diseases* (1822). See his *Life and Correspondence*, by Dr. J. Baron (1827-38; new ed. 1850).

Jenner, SIR WILLIAM (1815-98), English physician, was born at Chatham, and early began the investigations which enabled him practically to prove the difference between typhoid and typhus fevers. He held various professorships connected with medical theory and practice at University College, London, from 1849 to 1872. Appointed physician-in-ordinary to Queen Victoria (1862), and to the Prince of Wales (1863), he attended the Prince Consort in his last illness (1861), and the Prince of Wales in a similar attack of typhoid (1871). He was president of the College of Physicians (1881-8). He published *Diphtheria: its Symptoms and Treatment* (1861), and *Lectures and Essays on Fevers and Diphtheria, 1849-79* (1893).

Jennings, SIR JOHN (1664-1743), English admiral, was born in Shropshire; took part in the destruction of the shipping at Vigo, and was present at the capture of Gibraltar (1704), and in the action off Malaga. In 1706 he led a storming party at the assault of Alicante, and was promoted to be admiral (1708).

Jennings, LOUIS JOHN (1836-93), English journalist, went in 1863 as the representative of the *Times* to India, where he also edited the *Times of India*. After representing the former journal in the United States, he published *Eighty Years of Republican Government in the United States* (1868), and subsequently became editor of the *New York Times*, in which he vigorously exposed the wrong-doings of the Tammany Ring. Returning to England in 1876, he edited *The Croker Papers* (1884), and Lord Randolph Churchill's *Speeches* (1889), besides publishing his antagonistic *Mr. Gladstone: A Study* (1887). In 1885 and 1886 he represented Stockport in Parliament as a Conservative,

Jennings, SIR PATRICK ALFRED (1831-97), premier of New South Wales, born at Newry, Ireland; emigrated to the Victorian gold fields (1852), eventually (1863) settling in New South Wales. Appointed a member of the Legislative Council or Upper House (1867), he in 1885 became colonial treasurer, and in 1886 united with that office the premiership. Resigning in 1887, he represented his colony at the London Colonial Conference in that year.

Jennings, SARAH. See MARLBOROUGH.

Jenolan Caves, formerly FISH RIVER CAVES, fine stalactite caves, 113 m. w. of Sydney, N.S.W., Australia.

Jensen, ADOLF (1837-79), German musical composer, born at Königsberg, became teacher at Tausig's school at Berlin. Since Schumann, no one has equalled him as a song composer. His noteworthy books of song include *Dolorosa* and *Gaudeamus*. In instrumental music he produced *Hochzeitsmusik* and *Eroticon*.

Jensen, PETER (1861), Assyriologist, was born at Bordeaux; became professor (1892) at Marburg. Dr. Jensen has published *Kosmologie der Babylonier* (1890), *Hittiter u. Armenter* (1898), *Assyrischbabylonische Mythen* (1900-1), section 'Hittites' in Hilprecht's *Explorations in Bible Lands* (1903), and *Das Gilgamesch-Epos in der Welt-literatur*, and is ranked as one of the ablest Assyriologists of the day.

Jenyns, SOAME (1704-87), English author, born in London; published some early poems in 1752. He sat in Parliament for Cambridgeshire (1742-54; 1760-80), and for Dunwick (1754-60). In 1757 he published his *Free Inquiry into the Nature and Origin of Evil*, which drew from Dr. Johnson a powerful and severe criticism in the *Literary Magazine*. This was followed by *View of the Internal Evidence of the Christian Religion* (1776). See Memoir by C. N. Cole, in collected edition of Jenyns's works (1790).

Jephthah, one of the judges of Israel. A native of Gilead, with a stigma upon his birth, he became the chieftain of a band of freebooters, and was made leader of the Israelite forces during the Ammonite oppression. Before the contending armies met, Jephthah made a vow before Jehovah that he would, in case of victory, sacrifice whosoever he should meet coming forth from his house at Mizpah on his return. He routed the enemy, and as he drew near his home he was met by his only daughter at the head of a chorus of maidens coming forth to greet the victor.

The vow was duly performed. The name Jephthah gives some colour to the supposition that the story is a Hebrew replica of the Greek legend of Iphigenia (Jephthah-geneia), but sound scholarship lends no countenance to the identification. See Judges 11, and Moore's commentary on the passage. Jephthah is also noted for his subjugation of the tribe of Ephraim.

Jerablus. See CARCHEMISH.

Jerash. See GERASA.

Jerba, or GERBA, or GERBI (anc. *Meninx*), isl. (425 sq. m. in area) in the Gulf of Gabes, Africa, off the S.E. coast of Tunis, known as the island of the lotus-eaters. It produces dates and olives, and is a sponge-fishing centre. Pop. about 45,000.



Jerboa.

Jerboa. The true jerboa is *Dipus jaculus*, a small rodent occurring in desert regions in Arabia, Egypt, and westwards to Algeria. The head and body measure together about six and three-quarter inches, the long tail with its terminal brush of hair over eight inches; the hind limbs are very much longer than the fore, and bear only three digits each. The animal habitually carries its small fore limbs pressed close to the chest, and then it appears as if only the hind limbs were present. In colour the little creatures are beautifully adapted to their sandy surroundings. They are burrowing, nocturnal animals, feeding on vegetation and on insects and carrion, and when alarmed progressing by rapid leaps. Allied species occur in Asia; but there the name jerboa is also applied to the members of the genus *Alactaga*, in which there are five toes on the hind feet, and a more distinctly tufted tail than in *Dipus*. The best known species is *A. decumana* of Asia and parts of E. Europe. It is eight inches long, and is a gregarious animal, at home especially in the steppes of Central Asia, where it is eaten by the Kirghiz and other tribes. Its movements are exceedingly swift. See also JUMPING MOUSE and JUMPING HARE.

Jerdan, WILLIAM (1782-1869), critic and writer, was born at Kelso, Scotland. From 1817 to 1851 he was editor of the *Literary Gazette*, London, and also wrote much for the *Edinburgh* and *Quarterly Reviews*. He was one of the founders of the Royal Society of Literature (1821). See his *Autobiography* (4 vols. 1852-53).

Jeremiah, one of the greatest of the Hebrew prophets, was the son of Hilkiah, a priest. He was called to the prophetic office in the thirteenth year of Josiah's reign (c. 626 B.C.), while yet relatively young ('a child,' 1:6). He soon saw that the reform of Josiah was largely external, and it became his special task to proclaim the inwardness of the divine law to a people disloyal in heart. In consequence of this attitude, he seems, from an early stage in his career, to have encountered much opposition and ill-treatment, and during the closing years of the Judahite monarchy his sufferings reached a pitch of tragic intensity. Under Jehoiakim he lived in imminent danger of death, while under Zedekiah (who personally was rather well disposed towards him), particularly during the siege of Jerusalem by the Chaldeans, he was treated with unspeakable degradation and cruelty. When the city at length fell, he was kindly dealt with by the Babylonians, and permitted to retire to Mizpah; he was afterwards taken to Egypt, where, according to tradition, he was ultimately stoned to death at the city of Tahpanhes.

The Book of Jeremiah consists very largely of threatenings of judgment upon a people who have broken God's covenant, with promises of a new and better covenant (ch. 1-33); ch. 34-45 tell the story of Jeremiah's sufferings during and after the siege, with occasional oracles; ch. 46-51 contain warnings to foreign nations; while ch. 52 is a historical appendix relating to the capture of Jerusalem (cf. 2 Kings 25). But the arrangement of the book is by no means chronological. The first draft, written at Jeremiah's dictation by Baruch, was cut to pieces and burnt by King Jehoiakim (36:23); a second, containing the matter of the first, with considerable additions not now distinguishable, forms the larger part of our present book. With this there were combined (? by Baruch) the narratives of Jeremiah's life which are found interspersed throughout the whole (e.g. ch. 26, 37-44; probably also 46-51), and the collection seems to have undergone a final redaction in post-exilic times. The Septuagint version of Jeremiah

seems to presuppose a very different text from the Hebrew: it is about one-eighth shorter, and shows considerable divergence in the arrangement of the material. The probable explanation is that it was made from a Hebrew text belonging to a time previous to the final redaction. Since the prophecies were not committed to writing by the prophet himself, we can hardly speak of his literary style; yet the prevailing tenderness and sadness of his nature can be traced beneath the scribe's work. As a religious teacher Jeremiah was the first to emphasize the responsibility of the individual, and thus took an all-important step in the development of a national religion into a universal religion. See works by Ewald (1868), Keil (1872), Streane (*Camb. Bible*, 1881), Cheyne (*Pulpit Com.*, 1883, and in *Men of the Bible Series*), Duhm (*Kurzer Hand-Commentar*, 1901).

Jérémie, seapt., Haiti republic, on N. coast, 119 m. W. of Port-au-Prince; exports cocoa. It was the birthplace of the elder Dumas.

Jerez de la Frontera, city, prov. Cadiz, Spain, 12 m. N.E. of Cadiz. It is a progressive place, producing sherry, so called from the name of the place. Fine cattle and horses are fed on the rich river (Guadalete) pastures. The old town has Moorish walls, a Moorish castle, and other remains. Jerez was a Roman colony, and fell into the hands of the Moors in 711, when Don Rodrigo, the Goth, was defeated. In 1265 Alfonso X. of Castile took the town. Pop. (1900) 63,473.

Jerez de los Caballeros, tn., prov. Badajoz, Spain, 40 m. S.S.E. of Badajoz. Wine, fruit, timber, and especially cork, are produced, and swine are kept. Pop. (1900) 10,271.

Jerfalcon, or GERFALCON, a group of falcons, of which the Greenland falcon (*Falco candicans*) may be taken as a type. All have slaty-gray or white plumage.

Jerichau, JENS ADOLF (1816-83), Danish sculptor, was born at Assens; studied under Thorwaldsen; attracted attention by a frieze in the royal palace of Christiansborg, near Copenhagen, the *Wedding of Alexander*, followed by *Heracles and Hebe* and *Penelope*. He has also produced *Huntsman attacked by a Panther*, *Adam and Eve*, *Christ*, *The Resurrection*, and a statue of *Oersted*.—His wife ELIZABETH (1819-81), a Pole, is well known for her pictures of country life in Poland and Italy; and their son HAROLD (1852-78) for his paintings of Italian and Oriental scenes.

Jericho, vil. in the Jordan valley, 15 m. E.N.E. of Jerusalem. The ancient city stood near the foot of the mountains, on the west side of the Jordan plain. The Roman city, which existed as early as the time of Christ, was rather farther south. In the middle ages the town stood farther east, where a 12th-century tower still exists. Jericho was famous for its palms and gardens of balsam.

Jeroboam I., first king of Israel—i.e. the northern kingdom (B.C. c. 937-915)—was the son of Nebat. Originally an administrator of taxes under Solomon, his growing power in his own tribe (Ephraim) excited the king's jealousy, and he retired to Egypt. Returning after Solomon's death, Jeroboam led the popular revolt against Rehoboam's oppressive policy, and eventually became king of the ten northern tribes. Having restored Shechem and made it his capital, he established sanctuaries at Bethel and Dan, ordaining priests, etc.—a step which ultimately brought disaster upon his person and dynasty. Towards the end of his reign he sustained a crushing defeat at the hands of Abijah of Judah. (See 1 Kings 11:26; 2 Chron. 13.)

Jeroboam II., king of Israel (B.C. 790-749), was the son and successor of Joash, and an even stronger ruler than his namesake. He restored the coasts of Israel, and 'recovered Damascus'—i.e. (probably) made it tributary. Successful as he was, however, in a material sense, the kingdom was morally and spiritually on the down grade, and he did nothing to arrest the decline. (See 2 Kings 14:23-29.)

Jerome, whose full name was SOPHRONIUS EUSEBIUS HIERONYMUS, one of the greatest of the Latin fathers, was born of a Christian family at Stridon, a frontier town between Dalmatia and Pannonia, c. 346 A.D. In early youth he went to Rome, where he received a liberal training under Donatus the grammarian, Victorinus the rhetorician, and Bishop Liberius; here also he was baptized. An earnest seeker after truth, he travelled to Treves, then to Aquileia, in furtherance of his studies; thence to the East, where an impressive dream drew him from the classics and turned him more zealously to the Bible and the gospel. Ascetically inclined, he lived for a while in the desert near Antioch, and there, as a means of self-discipline, he learned Hebrew from a converted Jew—an episode fruitful of great results in the history of Biblical scholarship. Thereafter he became a presbyter at Antioch, resided for

a while at Constantinople, and in 382 returned to Rome and became secretary to Bishop Damasus. Here he undertook the revision of the old Latin version of the New Testament; but his labours tended to awaken resentment among both clergy and laity. Jerome left Rome in 385, and in the following year settled at Bethlehem, where he founded a monastery, chiefly through the beneficence of a Roman lady named Paula, who likewise founded a convent for women. Here Jerome laboured for thirty-four years, completing his translation of the whole Bible; here he died 420 A.D. He is usually reckoned the pre-eminent scholar of the Western Church. A most vehement temper reveals itself in his controversies with heretics, and even with his erstwhile friend Rufinus. Editions of his works (polemical, exegetical, and versions) by Erasmus (1516), the Benedictines (1693 f.), Vallarsi (1734 f.). See vols. by Thierry (1867), Zöckler (1865); and Farrar's *Lives of the Fathers*, ii. 203 ff.

Jérôme Bonaparte. See BONAPARTES, THE.

Jerome, JEROME KLAPKA (1859), English author and editor, born at Walsall. In 1885 he published *On the Stage and Off*, followed by *Idle Thoughts of an Idle Fellow* (1886), and *Three Men in a Boat* (1889), the abounding humour of which has won for it a wide reputation. From 1892-7 he edited *The Idler* with Robert Barr, and from 1893-7 *To-Day*. For the stage he wrote *Sunset* (1888), a comedy; *Wood Barrow Farm* (1888); and *The MacHaggis*, a farce (1897). Among his other publications are *Sketches in Lavender* (1897), *Letters to Clorinda* (1898), *Three Men on the Bummel* (1900), *Paul Kelter* (1902), *Tea-Table Talk* (1903), *Tommy and Co.* (1904), and *Idle Ideas in 1905* (1905).

Jerome of Prague (d. 1416), the friend of Huss, was a native of Prague; imbibed Wycliffe's teaching in England. When Huss was taken prisoner at Constance, Jerome hastened to defend him, was himself seized and imprisoned, recanted his heresies, and finally, having withdrawn his recantation, perished at the stake at Constance on May 30, 1416. It has been asserted that his family name was Faltisch, but this is incorrect.

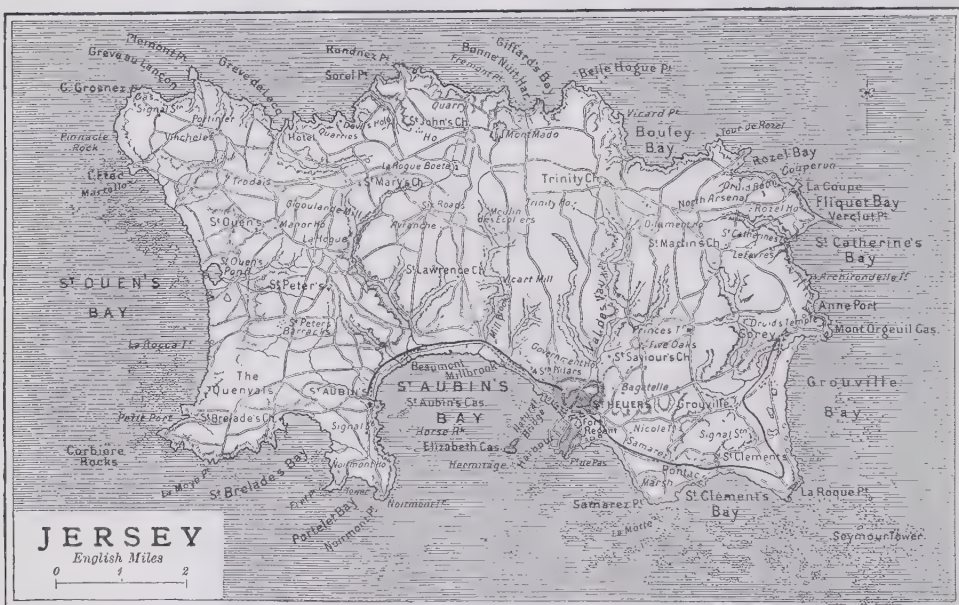
Jerrold, DOUGLAS WILLIAM (1803-57), English dramatist, journalist, and author, born in London. A criticism of the opera *Der Freischütz*, sent to his master anonymously, proved the first step in his journalistic career. At the same time he achieved a brilliant success with his piece *Black-eyed Susan*, which

was played four hundred times in 1829. Other plays were *The Devil's Ducat* (1830), *The Bride of Ludgate* (1831), and *Time Works Wonders* (1845). As a contributor to *Punch*, Jerrold was in his element; in it appeared his *Q. Papers*, *Punch's Letters to his Son* (repub. 1843), *Punch's Complete Letter-Writer* (repub. 1845), and *Mrs. Caudle's Curtain Lectures* (repub. 1846). At various times he edited the *Illuminated Magazine* (1843-5), *Douglas Jerrold's Shilling Magazine* (1845), *Douglas Jerrold's Weekly Newspaper* (1846), and *Lloyd's Weekly Newspaper* (1852-57). Among his works which are levelled with more seriousness against current evils are *The*

works are *Michael Faraday* (1893), *W. E. Gladstone* (1893), *Oliver Wendell Holmes* (1893), *The Triumphs of the Printing-Press* (1896), *Monograph on George Meredith* (1902), and *Fire-side Saints* (1904). He has also edited Douglas Jerrold's *Essays* (1903), and volumes for the Temple Classics and other series.

Jerrold, WILLIAM BLANCHARD (1826-84), English author and journalist, born in London, son of Douglas Jerrold, published as his first work *A Story of Social Distinction* (1848). As a contributor to three journals he went to Paris in 1855, and subsequently spent half his time in that capital. His farce, *Cool as a Cucumber* (1851), achieved marked

with which Jersey maintains regular steamboat communication. The coasts are rock-bound, high on the N., but stretching out S. for a long distance as low, jagged reefs, and contain several safe bays. The harbour of St. Helier, the chief port, and centre of approximately one-half of the population, on the S. coast, is dry at low water. The island, naturally fertile, has been rendered still more productive by the unremitting industry of the inhabitants, mostly small farmers, who grow early potatoes, tomatoes, grapes, etc., for the English market, and breed a valuable race of small milch-cows. The island enjoys annually five per cent. more sunshine than the sunniest spots on



Story of a Feather (1844), *The Chronicles of Cloverbrook* (1846), and *A Man Made of Money* (1849). A selection from his newspaper 'leaders' was published in 1868, under the title *Other Times*. The fault of his literary work is an extremity of invective; but it is for the singular flash and sparkle of his writing, as of his conversation, that he is remembered. His collected works were published in 1851-4, and in 1863-4. See *Life* by W. Blanchard Jerrold (1859).

Jerrold, WALTER COPELAND (1865), English author and journalist, born at Liverpool, grandson of Douglas Jerrold, became connected with the *Observer*, of which he is now sub-editor. In 1900 he became assistant-editor of the *Londoner*. Among his

success in London, where his *Beau Brummel* (1858) and *The Chatterbox* (1857) were also played. He published sketches of great writers, entitled *The Best of All Good Company* (1873), also novels and many other books, besides a *Life* (1859) of his father, a *Life* of George Cruikshank (1882), and letterpress for Doré's *London* (1871).

Jerrymander. See GERRY, ELBRIDGE.

Jersey, largest of the Channel Is., belonging to the United Kingdom, with an area of 45 sq. m. and (1901) a population of 52,796, mostly of Norman extraction. It lies about 15 m. from the coast of Normandy, 95 from Weymouth, and 130 from Southampton, the two English ports

the S. coast of England. Jersey governs itself by means of an assembly (the 'States'), partly elected, partly *ex-officio* members; the English crown being represented by a lieutenant-governor. See, further, CHANNEL ISLANDS.

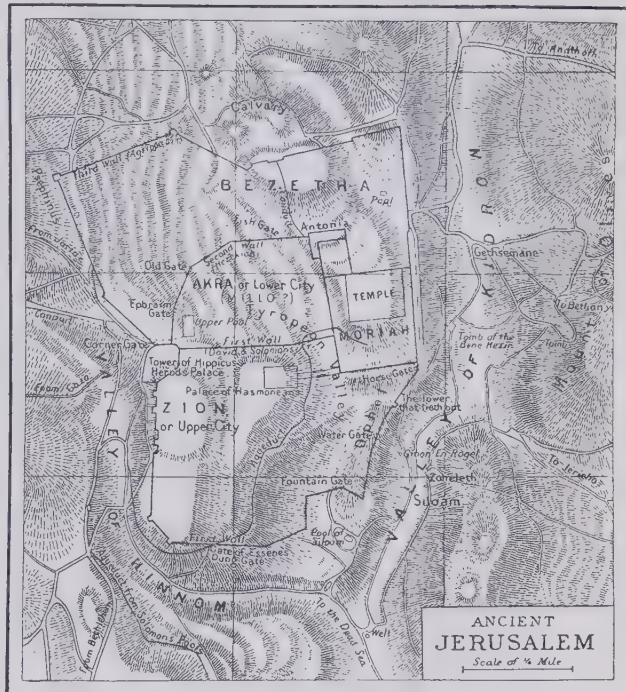
Jersey City, city and cap. of Hudson co., New Jersey, U.S.A., on the w. bk. of Hudson R., opposite the S. end of Manhattan borough. It is a railway terminus of the first importance; also one of the chief seaports of the country, though forming part of the port of New York. The manufactures include slaughtering and pork-packing, sugar-refining, tobacco, soap, and perfumes. The population in 1900 was 206,433, the number of foreign born being 53,424, or 25.3 per cent.

Jerusalem (under Rome, *Ælia Capitolina*; modern, *El Kuds*), the capital of Palestine. Its situation is $31^{\circ} 47'$ N. lat., $35^{\circ} 15'$ E. long.; otherwise on a line passing nearly due W. from the N. end of the Dead Sea, at about one-third of the way (15 m.) towards the Mediterranean. It occupies a tongue of limestone rock, which mounts to the watershed on the N.W., and terminates abruptly on the S. in two eminences, Mount Zion and Mount Moriah, overlooking the valley of Hinnom (S.W.) and the Kidron valley (E.) respectively. Between these heights, again, issues the Tyropoeon valley, running E. then S. through the city. The three depressions converge to the S. of the city, forming the Wady en Nar, which drains the district towards the Dead Sea. Jerusalem proper is surrounded by a wall of hewn stone, $2\frac{1}{2}$ m. in circumference, and probably built by the Sultan Solyman the Magnificent. This wall is surmounted by thirty-eight towers and pierced by eight gates. The inner city is divided into four quarters—the Armenian in the S.W., the Jewish in the S.E., the Moslem in the N.E., and the Christian in the N.W. Since 1858 extensions have been made towards the N. and W. In the older part the streets are narrow, dull, and dirty. The noble Mosque of Omar, in the centre of the temple area, supposed to occupy the site of Solomon's temple; the Church of the Holy Sepulchre, on the reputed site of our Lord's tomb; and the Jews' Wailing Place, are among the more interesting places. The streets, both in the inner and the outer city, are badly paved, and the water supply and sanitary arrangements are so imperfect that outbreaks of fever are frequent, although the climate is not itself unhealthy. Jerusalem is the seat of Roman Catholic, Greek, and Anglican bishops (the last since 1842), and of an Armenian patriarch. The manufactures are mostly of articles of mother-of-pearl and olive wood for pilgrims and tourists. Since 1892 a narrow gauge railway, 54 m. long, has connected Jerusalem with its port, Jaffa (Joppa). Pop. (1899) 48,600, more than half being Jews.

The Tell-el-Amarna tablets reveal that there was an important town on the site of Jerusalem in the 15th century B.C., called Urusalim. The earliest mention of the place in Scripture is in Gen. 14:8, where Melchizedek is called 'king of Salem.' It next appears as Jebus, the stronghold of the Jebusites, which long held out against the Israelite invaders (Josh. 10:5; Judg. 19:10). With King David a new chapter opens;

for it was he who made the final conquest of the fortress, joined the lower city with the citadel of Mount Zion, built a wall round both, and by bringing the ark within its precincts made it both the political and the religious capital of his dominions (c. 1000 B.C.). The first temple was built by Solomon, who also constructed a magnificent palace, and extended the surrounding wall. After the revolt of Jeroboam, the city was successively attacked by Shishak, king of Egypt (c. 935 B.C.), the Philistines and Arabs (c. 850 B.C.), Jehoash, king of Israel (786 B.C.), all of whom inflicted more or less damage;

the machinations of the Samaritans, was completed in 515. Ezra, with another band of captives, returned in 458, and established the law, while Nehemiah rebuilt the wall, and again Jerusalem became the shrine of Israel. Alexander the Great is said to have visited the city in 332, and it endured severe handling in the struggles subsequent to his death. The revolt of the Maccabees brought a fresh succession of troubles upon it. It sustained sieges by the Greeks in 139, 134, 65, and 63 B.C., and the temple was pillaged in 55 B.C. The Roman domination, under Herod, brought an interval of peace.



and during the 8th century the growing activity of Assyria (Samaritans fell in 721 B.C.) caused various steps to be taken by Uzziah, Jotham, and Hezekiah for the better security of the capital. In B.C. 701 Sennacherib laid siege to Jerusalem, but was forced to withdraw by some mysterious disaster (2 Kings 19:35, 36). In 597, and more effectually in 586, Babylon took possession of the city, sacked it, and deported the élite of its inhabitants to Babylon. A new chapter begins with the return of the exiles under Zerubbabel and Jeshua (536 B.C.). A new temple was begun in 535, and after a long delay, caused by

Herod built a palace, restored the citadel Antonia, and in 19 B.C. began the erection of the third temple. But a revolt against Rome brought her legions to its walls, and after a siege of 143 days it fell to Titus in 70 A.D. In 134 A.D. the rebellion of Bar Cochba was the signal for another devastation; but in 136 Hadrian rebuilt the city, called it *Ælia Capitolina*, and generally paganized it. When the empire eventually became Christian, pilgrimages to the holy place increased greatly in number, and in 333 the Church of the Holy Sepulchre was founded—the finding of the true cross by Constan-

time's mother is a later story. Justinian also distinguished himself as a restorer; but in 614 Jerusalem was attacked by the Persians, and in 637 it passed into the power of Islam, falling to the Caliph Omar. The Arab overlords were on the whole not unfriendly to the Christians, and the city was well cared for under them; but when the Seljuk Turks came into power, their oppression of the pilgrims became a challenge to the Christian powers,

of exiled Jews, mainly from Russia. Only the fewest references to the voluminous literature on the subject can be given. For ancient history, see ISRAEL; for topography, Warren and Conder (1884), Bliss and Dickie (1898); for temple, De Vogüé (1863); for modern city, Baedeker's *Palestine and Syria* (by Prof. Socin).

Jerusalem Artichoke (*Heli-anthus tuberosus*), a native of N. America, where it was cultivated by the Indians. See ARTICHOKE.

and the deanery under Queen Elizabeth. In 1662 the Upper House of the Convocation of Canterbury met in this 'monastic parlour.' In 1689 the Commission for the Revision of the Liturgy sat in the Jerusalem Chamber, which was also, in recent years, the meeting-place of the revisers of the Old and New Testaments.

Jervaulx Abbey, a famous Cistercian abbey, built on the plan of Fountains Abbey, but now in ruins, N. Riding, Yorkshire, England, 13 m. N.W. of Ripon. It was founded in 1156. Prior Aylmer (see Scott's *Ivanhoe*) belonged to this abbey. Adam de Sedburgh, the last abbot, was executed (1537) for his share in the Pilgrimage of Grace.

Jervis. See ST. VINCENT.

Jeshurun, a Heb. name meaning 'much-beloved,' and used symbolically of Israel in Deut. 32:15, 33:5, 26, and Isa. 44:2.

Jesi, mediæval tn. and episc. see of Italy, prov. Ancona, 17 m. by rail S.W. of Ancona, with silk and other industries. Here was born the Emperor Frederick II. (1194). Pop. (1901) 23,285.

Jesmond. See NEWCASTLE-ON-TYNE.

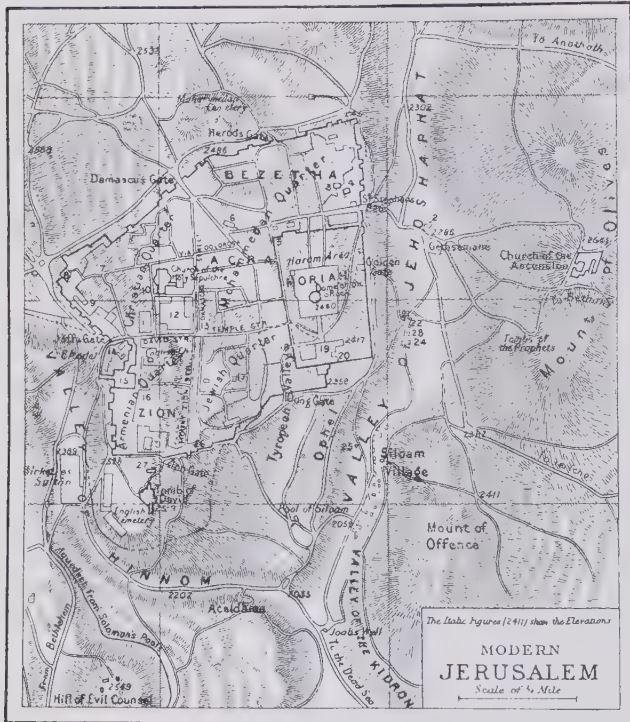
Jessamine. See JASMINE.

Jesse, EDWARD (1780-1868), English writer on natural history, born at Hutton Cranswick, Yorkshire; after being private secretary to Lord Dartmouth, became deputy surveyor of the royal parks and palaces. His works on country subjects include *Gleanings in Natural History* (1832-5), *An Angler's Rambles* (1836), *A Summer's Day at Hampton Court* (1839), *Scenes and Tales of Country Life* (1844), and *Lectures on Natural History* (2nd ed. 1863). He edited Walton's *Complete Angler* and White's *Selborne*.

Jesse, JOHN HENEGE (1815-74), English historical writer, son of Edward Jesse, was a clerk at the Admiralty. His first historical work, *Memoirs of the Court of England during the Reign of the Stuarts* (1840), met with appreciation; and was followed by *Memoirs of the Court from 1688 to the Death of George II.* (1843), *George Selwyn and his Contemporaries* (1843-4), *Memoirs of the Pretenders and their Adherents* (1845), *Memoirs of the Life and Reign of King George III.* (1867).

Jessel, SIR GEORGE (1824-83), English judge, born in London, of Jewish extraction. Called to the bar in 1847, he became solicitor-general (1871), and master of the rolls (1873). He revolutionized the conduct of business in the Rolls Court of Appeal, discharging it with unprecedented speed combined with accuracy.

Jessopp, AUGUSTUS (1824), English author, born at Cheshunt, Herts; headmaster of

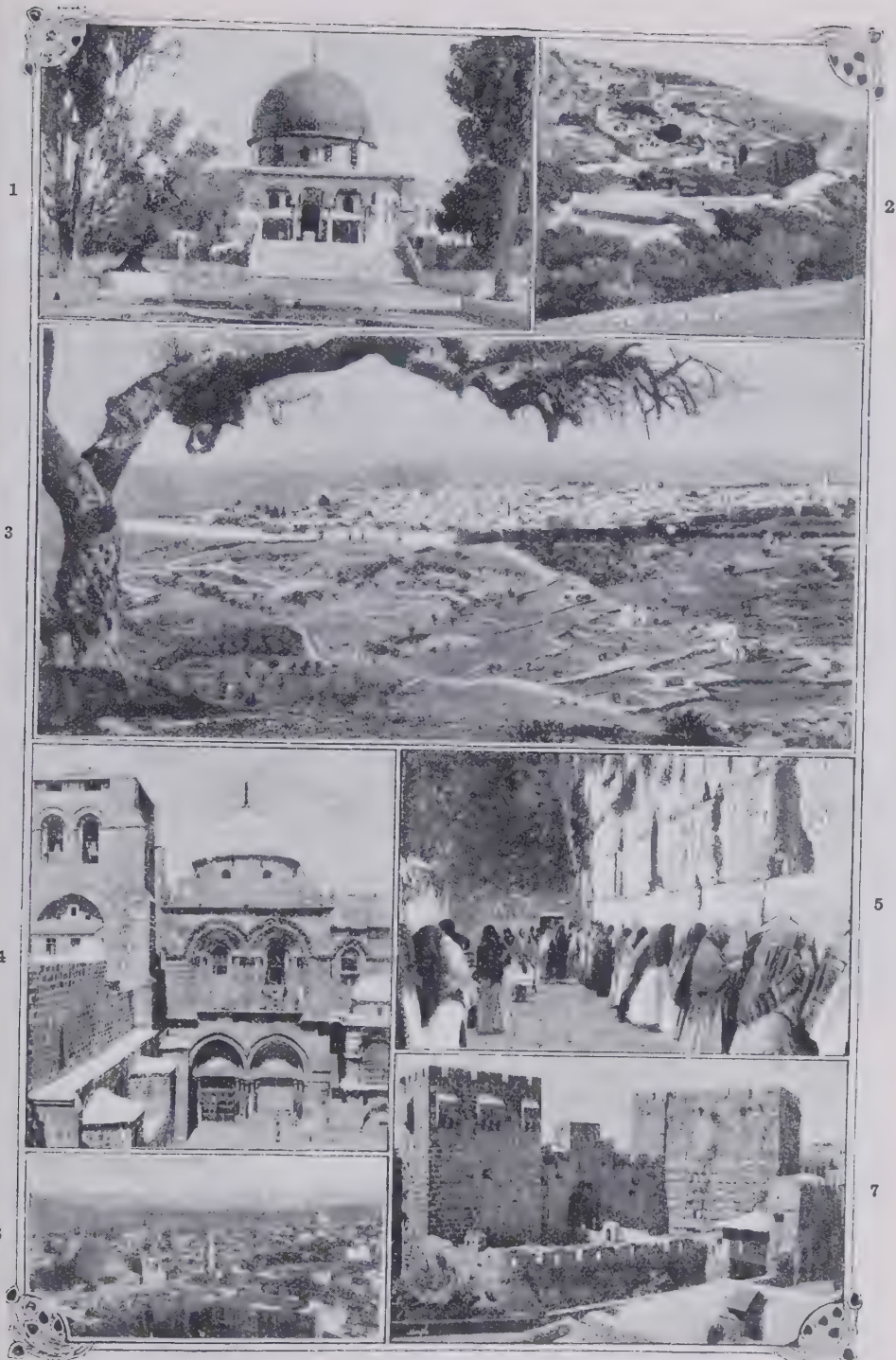


References to Numbers in Map.

- | | | |
|-------------------------------|--------------------------------|-----------------------------|
| 1. Grotto of Jeremiah. | 10. Greek Convent. | 19. Mosque El Aksa. |
| 2. Church of the Tomb of the | 11. Pool of Hezekiah. | 20. Solomon's Porch. |
| 3. Pool of Bethesda. [Virgin. | 12. Knights of St. John Hos- | 21. Tomb of Jehoshaphat. |
| 4. St. Anne's Church. | 13. Bazaars. [pital. | 22. Tomb of Absalom. |
| 5. Tower of Antonia. | 14. Tower of David (Hippicus). | 23. Tomb of St. James. |
| 6. Austrian Hospice. | 15. Barracks. | 24. Tomb of Zechariah. |
| 7. Latin Convent. | 16. Armenian Convent. | 25. Fountain of the Virgin. |
| 8. Goliath's Castle. | 17. Jewish Synagogue. | 26. Lepers' Village. |
| 9. Latin Patriarchate. | 18. Jews' Walling-Place. | 27. House of Calaphas. |

and the crusades were the result. Godfrey of Bouillon rescued the city in 1099, but it was retaken by Saladin in 1187. From 1247 it was subject to Egypt for two hundred and seventy years, but eventually fell to the Sultan Selim I. in 1517. In 1825 there was a partially successful revolt against the Turkish despotism, but in 1840 the authority of Turkey was confirmed by the powers. Of late the city has become the rendezvous of thousands

Jerusalem Chamber, THE, is in Westminster Abbey. The chamber, with its windows of stained glass, ascribed to the period of Henry III., and its panels of cedar wood, forms part of the deanery, which is itself part of the old abbot's house built in the reigns of Edward III. and Richard II. It was here that Henry IV. died. When Henry VIII. created the bishopric of Westminster, the abbot's house became the bishop's residence,



Views in Jerusalem.

1. Mosque of Omar. 2. Garden of Gethsemane. 3. Jerusalem from Mount Scopus (north-east). 4. Church of the Holy Sepulchre.
5. Jews' Wailing-Place. 6. General View within the city (from the tower of St. Sauveur). 7. Tower of David.

Helston Grammar School, Cornwall (1855-9), then of King Edward VI.'s School, Norwich (1859-79), and rector of Scarning (1879); is best known for his *Arcady* (1887), *The Coming of the Friars* (7th ed. 1895), *Trials of a Country Parson* (3rd ed. 1894), *Studies by a Recluse* (3rd ed. 1896), *Random Roaming* (2nd ed. 1896), and *Before the Great Pillage* (1901).

Jessore, chief tn. in Jessore dist., Bengal, India, 65 m. N.E. of Calcutta. Pop. (1901) 8,054. The district has an area of 2,925 sq. m., and a population in 1901 of 1,831,155.

the Scottish humanist, was probably better known for centuries as the reputed author of the stories collected in *The Witty and Entertaining Exploits of George Buchanan*, commonly called the *King's Fool*, than as a scholar. Among the most widely circulated of such jest-books are Tarlton's *Jests; a Hundred Mery Talys* (1st extant ed. 1611), to which reference is made in *Much Ado about Nothing*; and Joe Miller's *Jest-Book, or the Wits Vade Mecum* (1739). These, however, are only a few of the vast number of jest-books, a type of

Charles v. of France; Tibboulet, the fool of Louis XII., celebrated by Rabelais; Will Somers, the fool of Henry VIII.; and Archie Armstrong, the fool of James I. As a court institution the fool does not seem to have outlived the commonwealth. The earliest fools were probably real 'naturals,' or half-witted folk; in later cases the folly was mainly assumed, and served as a cloak for plain-speaking and ribaldry. So it is with the fools who figure in *As You Like It*, *Twelfth Night*, *King Lear*, and other plays of Shakespeare and his contempo-



Jerusalem Chamber, Westminster Abbey.

Jest-book. Many current stories and jests can be traced back through the monkish *raconteurs* of the middle ages to the East. We are not, however, to suppose that there has been deliberate borrowing. The fact is, that the humorous situations which appeal to men's minds are few and simple, and recur in all countries and among all races; and this is particularly true of practical joking. Collections of jests and humorous stories may be either avowed compilations, extracted from literature, history, tradition, and experience; but they are frequently fathered upon some notorious local or national jester. George Buchanan,

literature to be found in nearly all countries, and which prepared the way for the realism of the modern novel. See W. C. Hazlitt's *Shakespeare's Jest-Books* (1875).

Jester is properly a teller of *gestes* or heroic deeds (*gesta*). But in the decay of minstrelsy a *geste* came to mean a witty story or sally, and a *gestour* such a domestic fool or buffoon as great personages were wont to keep for their private entertainment. This custom can be traced in the Roman empire, was widespread in the middle ages, and lasted through the renaissance. Among famous fools are Thévenin de St. Leger, the fool of

varies. The description of Touchstone in *As You Like It* fixes the type. The traditional get-up of the court fool, the parti-coloured garments, the hood with cockscomb and asses' ears, the bauble or *marotte*, was probably borrowed in the 14th century from that of the so-called Feast of Fools. This was a New Year revel practised by the inferior clergy of cathedral establishments, in burlesque of divine service. The hoods probably represent beast-masks of sacrificial origin, worn by heathen revellers at the same period of the year. They therefore form a link between the court fool and the grotesque buffoon, with skin cap

and hanging cow's tail, who, under the name of 'fool' or 'squire,' makes his appearance in morris-dances, mummers' plays, and other diversions of the folk. See F. Douce's 'Clowns and Fools of Shakespeare,' in *Illustrations of Shakespeare* (1839); J. Doran's *History of Court Fools* (1858); E. K. Chambers's *Medieval Stage* (1903).

Jesuits, THE, or SOCIETY OF JESUS, for which the letters S.J. are commonly used as an abbreviation, are a religious order founded by Ignatius Loyola in 1534. Like other religious orders, the members are bound by the three religious vows of poverty, chastity, and obedience, and their rule of life is more or less exactly laid down in a written code of 'constitutions' approved by papal authority. The society found its special work in trying to stem the rising tide of Protestantism, and is closely identified with the counter-reformation. The members of the society are divided into priests, scholastics (intended ultimately for the priesthood, but for the time being engaged in teaching or studying), lay brothers, who do the work of the house, and novices, who are as yet bound by no vows. Very great power is vested in the head of the order, the 'father general,' who is elected for life; but this power is in practice controlled by a small council of five assistants, who represent respectively the Italian, Spanish, German, French, and English-speaking groups of 'provinces.' Each province is ruled by a provincial; but the provincials and rectors, or heads of all the more important colleges and residences, are appointed by the general, not elected by the votes of their subordinates.

The popular conceptions of a code of secret instructions (*Monita secreta*), or of an inner circle of the initiated, like the highest grades of the masonic lodges, or again of an elaborate system of lay spies and secret emissaries, are fictions. The documents by which these legends are supposed to be proved have repeatedly been shown to be forgeries. (See Duhr's *Jesuiten Fabeln*, 4th ed. 1904.) The order was instituted to undertake every kind of apostolic work—everything, that is, which can be brought under the formula *ad maiorem Dei gloriam* ('for the greater glory of God'), the initial letters of which, A.M.D.G., may in some sense be regarded as the distinctive device of the society. But three forms of activity are singled out as especially proper to the institute—viz. the work of teaching the young, preaching to the ignorant and the heathen, and guiding Christians in the

way of perfection, this last object being carried on through the confessional and through the spiritual exercises, a scheme of devotional training of which Ignatius himself was the author. The Jesuits may be said to have been the first of the distinctively educational orders; and they have always attached special importance to missions to the heathen, since every professed father takes a vow to undertake any mission upon which the Pope may send him, even at the risk of life. In two other respects Ignatius departed from received precedent: (1) he did not bind his followers to the chanting of the office in choir, a duty which in the older orders occupied much time; (2) he exacted from all the professed a special vow to accept no ecclesiastical dignity. In the relatively few instances in which Jesuits have been made cardinals or bishops, this has only been done by the direct command of the Pope, who dispensed them from this vow.

The development of the society was rapid. At the death of its founder in 1556 it numbered rather more than 1,000 members, divided into twelve provinces. Nine years later, when the third general was elected (St. Francis Borgia, formerly duke of Gandia), the numbers had risen to 3,500, in eighteen provinces. Huge day schools like the Collegio Romano, which in 1584 numbered over 2,100 students, sprang up in every province; and during the 17th and 18th centuries the pupils in the secondary schools conducted by the Jesuit fathers probably reached an average of 210,000 annually. (See Schwickerath's *Jesuit Education*, p. 144; 1903.)

St. Francis Xavier, the companion of Ignatius, preached the gospel with extraordinary success in the remotest parts of India and Japan. A little later other fathers gained a remarkable influence in the heart of the Chinese empire. In the southern hemisphere the dream of a Christian Utopia seemed to many to be realized in the famous Jesuit 'reductions' of Paraguay (see Cunningham Graham's *A Vanished Arcadia*, 1901); while it would be hard to find a parallel to the heroism of such missionaries as Fathers Brebeuf and Jogues in preaching to the North American Indians. Upon this see, for example, F. Parkman's *The Jesuits in North America* (new ed. 1901), and Thwaites's American edition of the *Jesuit Relations* (1896, etc.).

In their more controversial labours the Jesuits have generally appeared as the champions of papal authority in the form which would now be described as ultra-

montanism. During the 16th century they, and in particular Peter Canisius, did much to disseminate these ultramontane views in Germany. In France the Jesuits were the great opponents of Jansenism, and, on the whole, of Gallicanism. In England, owing largely to the dominant influence of Robert Parsons, they were often reproached by their co-religionists for inclining to a policy which was Spanish and inquisitorial.

No body of men, with the possible exception of the Jews, has ever been more fiercely denounced than the Society of Jesus. They have been largely identified with unpopular causes; the satire of Pascal's *Provincial Letters* has been understood in a bitter earnest which the author himself never intended; and the strict organization of the society has tended to produce a more perfect solidarity, and at the same time a greater isolation, than in the case of other similar associations. They have, at one time or another, been expelled from almost every country in Europe; and towards the close of the 18th century a coalition of the powers under Bourbon influence brought pressure to bear upon the reigning Pope, Clement XIV., to secure the suppression of the order. This was accomplished by the brief *Dominus ac Redemptor Noster*, July 21, 1773. In Russia, however, where the brief could not be published, a few Jesuits still hung together. Their continuance was formally sanctioned by Pius VI. in 1801; and his successor, Pius VII., in 1814 restored the society throughout the world. At the present day, though the order is banished from Germany and dispersed in France, it numbers about 15,400 members. There are about 700 Jesuits belonging to the English province. See the comprehensive narrative of Crétineau-Joly, *Histoire de la Compagnie de Jésus* (6 vols. 1844-46), or its English summary by B. Neave, *The Jesuits* (1879), as well as the great series of *Monumenta Historica Societatis Jesu* (1898, etc.). The *Records of the English Province* (including Scotland) have been published by H. Foley (7 vols. 1877-83). *The Life of Father John Gerard*, and other books by John Morris (1881), as well as the *Narratives of Scottish Catholics* (1885), by Forbes Leith, are reliable. The Rev. E. Taunton's *History of the Jesuits in England* (1901) is written from an antagonistic standpoint, but it is not to be classed with such wildly extravagant books as Nicolini's *History of the Jesuits* (trans. 1849), or Walsh's *Jesuits in Great Britain* (1903).

Jesuits' Bark. See CINCHONA.

Jesus Christ. There are obviously many possible ways of treating the history of Jesus. But effort may here be most wisely concentrated upon the attempt:



Bethlehem, from the Church of the Nativity.

to present Jesus, as far as possible, as His contemporaries and especially His friends knew Him, and to trace in the same way, through a few episodes only, the history of His life and the development of His thought. Such an aim, therefore, will limit itself to as simple and as immediate a rendering of Him as possible; it will not, for example, allow scope for a discussion of Christian doctrine as it has been formulated by the church. The same consideration will prevent any examination of questions of historical criticism, or of the supernatural element in the life of Jesus, not because these are not intimately bound up with the subject, but because their importance requires separate treatment. Moreover the method of Jesus himself was simple and personal, proceeding from things which could be immediately perceived up to things grasped only by thought; and it is possible that no attempt to render Him can pursue a truer line.

The material for a biography of Jesus must be found in the four gospels. Of these, the second and the third were written by men who gathered their knowledge from eye-witnesses; the first by Matthew, one of the companions of Jesus; and the fourth, according to an important section of scholarly opinion, either by or practically at the dictation of John, the closest friend of Jesus. According to these authorities, then, and upon the lines already indicated, the life of Jesus may be sketched thus. He was born in Bethlehem, a village of Judæa, four years before the date reckoned as the beginning of the Christian era. The national conditions into which He entered were unsound, both politically and religiously. Politically, the Jews were subject to

Rome. Among the great majority of the people the Roman rule was very unpopular, and the old national spirit concentrated itself in a passionate desire for and

occasional efforts after freedom. There were, however, two sections of the nation whose main interest ran in other directions. One of these was the party of the Sadducees, who held in their hands all the political influence of the high-priesthood—an influence which they made the highest, next to the Roman power, in the state. Their preoccupations, therefore, were political rather than religious, and to them all

issues, who were much more concerned with religious than with political issues. They had preserved the old Jewish religious traditions, but in a form that was stereotyped and without vitality. Their religion was centred in ceremony, and their morality in minute and irrelevant points of conduct. Formalism had frozen religious life as expressed in the dominant religious caste, and all the evils attendant on the existence of such a caste were being felt to the full. But among all these adverse conditions there was left a 'righteous remnant' in whom the more vital religion of prophetic times survived, and who waited humbly for some visitation of Jehovah which should redeem His ancient people from the tyranny of the stranger, and set up once more in the holy city a religion pure and undefiled. This hope was shared, if in a less devout and more material fashion, by the mass of the people. It was the hope, rooted far back in Old Testament prophecy, of a Messiah, who at this date was conceived especially under the form of a national deliverer from present tyranny.

Such, very briefly, were the forces at work in the nation while Jesus was growing up at Nazareth. Only one episode is recorded of His childhood. At the age of



Nazareth.
(Photo by Darlington.)

sedition, all stirring of patriotic feeling, was unwelcome, as tending to disturb the balance which was so favourable to them. The other party was that of the Phar-

twelve, when, from a religious point of view, the Jewish boy assumes the responsibilities of manhood, Jesus was already thirsting to know all that could be learned

of those spiritual realities with which He felt His 'Father's business' was intimately concerned. And this imperative need so occupied His mind that, on his memorable first visit to Jerusalem, He remained in the temple questioning the doctors of the law when His parents had started homewards to Nazareth with their company. And His single question in answer to their reproaches, 'Wist ye not that I must be about my Father's business?' betrayed a sense of a mission which might at some future time claim the right to absorb His life (Luke 2:41 ff.). Apart from this single indication, there is no hint of what was passing in His mind during the years of His youth. Only, it is clear that this outbreak of independent action was, for a time at least, a solitary instance; for it is recorded that He went down with His parents to Nazareth, 'and was subject unto them,' and, adds St. Luke, He 'increased . . . in favour with God and man.' Beyond this, there is no record of Him until, at the age of thirty, He came suddenly before the public eye.

The time was one of moral awakening; and thousands were drawn out into the wilderness by the preaching of John the Baptist (Matt. 3), who proclaimed the inviolability of righteousness and the approach of a judgment which only repentance could ward off. The crowds who responded to his appeal accepted baptism in the Jordan as the seal of their new endeavour, and among the crowds came Jesus. But when He came forward with the rest, John hesitated. In Jesus he recognized some spiritual quality so distinguished that to him it seemed more fit that Jesus should administer baptism than receive it; more than this, he held Jesus to be that greater One whose coming he had foretold, and the latchet of whose shoes he was not worthy to unloose. Yet he yielded to the request, and Jesus was baptized. To them both this day marked a great experience, and its significance to them took shape in the vision of a dove descending upon the head of Jesus. There came also a voice from heaven, which said, 'This is my beloved Son, in whom I am well pleased.' On this day Jesus received what was felt to be a direct gift and recognition from on high, which confirmed in Him the sense of His mission.

It was soon after this that there followed the great crisis in the life of Jesus. He had come to His prime; He held in His hands powers which were unequalled among His own people and even in the world—powers of personal influence and domination which

would have sufficed to construct and rule a world-empire, and powers of reaction upon nature in unknown ways, the exercise of which in certain directions would have sufficed to seal in the popular view His Messianic authority and to gather the nation round Him. These were the weapons which He held, and there is no question that from the first His one idea was to use them in the service of righteousness, of that compelling ideal which was not external to, but one with, His inmost soul. But there faced Him the inevitable temptation of expediency. Should these weapons be used in the obvious ways—to save His own life for

through service and not through the assertion of the self, in however exalted a fashion; and with this went the determination to renounce the help of physical force, and to commit the issues to the sphere of the spirit only, even to the acceptance of apparent defeat. These were the lines upon which His whole mission was pursued, and in the pursuit of which He went deliberately to death.

An incident recorded by St. John (ch. 4) as having happened not long after this is significant of the attitude which Jesus was taking up. On His way from Jerusalem into Galilee He passed through Samaria, and rested by



Ford of the Jordan, and the traditional Place of Baptism.

the sake of His cause; to bring the people into the service of that cause by the exhibition of wonders; or to work out the immediate triumph of that cause by the exercise of whatever means, physical or spiritual, presented themselves as most opportune? The story comes to us, as He must have told it, in parable (Matt. 4:1-11), and it is probable that it could have been told in no truer way. Enough is there to show that then He finally chose that line from which He never afterwards swerved, and which represents the revolution which He effected in human ideals. In that time of sorrow was born the central and distinctive idea of Christianity, the idea of victory

Jacob's well. He met there a woman whom the ordinary Jew would have ignored as a woman and a Samaritan, and He spent some time in trying to make clear to her certain truths which He held to be the basis of religion, and which were the very springs of His thought and the centre of His message. Thus: 'The hour cometh, and now is, when the true worshippers shall worship the Father in spirit and in truth: for the Father seeketh such to worship him.' For 'God is a Spirit: and they that worship him must worship him in spirit and in truth.' These two sayings—the latter indeed apprehended by the devout in all ages, the former tentatively clung to by a few, but

now given forth with a tone of authority which was new—were characteristic of Jesus, and the audience of despised Samaritans was typical of many of the audiences which were to hear Him in the time to come. The impression which He made upon these people was such that, before the end of His two days' sojourn among them, some of them even believed Him to be the long-expected Christ (John 4: 40, 41).

The first notable step in preparation for His public work was the summoning by Jesus of the men who were to be His companions in it. According to St. John (1: 35-42; cf. Matt. 4: 18-22), those who first joined Him—viz. Simon and Andrew, probably also James and John—while followers of John the Baptist, had had some intercourse with Jesus. Nevertheless the fact that at His call they left their nets and went to share His life points to some

The situation was summed up by Peter when he said, 'Lord, to whom shall we go? Thou hast the words of eternal life.'

The people saw in Him a new prophet who could only be explained as the reincarnation of Elijah or Jeremiah (Matt. 16: 14). But, besides this, they knew Him as one who would turn aside to cure any human ill, great or small, that He could touch; who cared for children and other weak things of the earth, and even exalted them; and to whom nothing human was alien. He was not a recluse, but was ready to meet and eat with them, and rejoice and sorrow with them, on simple human levels. And because holiness, the 'perfectly good will,' and the concomitant harmony with God, seemed to Him the supreme good, His effort to help was often concentrated on the putting of the soul in a position to reach this good. But this

it went hand in hand also with a great personal courage, and a power to command to which our modern conception of Jesus, and more especially the artistic conception, does great injustice. To it He is only the 'Man of sorrows,' or the lover of children, the forgiver of the sinning, the comforter of the sad. But it was not in such a character that, single-handed, He drove the money-changers from the temple (Matt. 21: 12); it was not a person lacking in virility whom a furious mob in Galilee could not summon courage to touch, but who, 'passing through the midst of them, went His way' (Luke 4: 30); or who repeatedly let loose the most burning invective upon the classes who held the people in their hands; or who sent to Herod a message of scorn, which was as much as His life was worth (Luke 13: 32); or who, standing in peril of death, could occupy Himself with the effort to make Pilate assert himself truthfully and play the man (John 18: 28 and 19: 16).

It was this claim to authority and actual assertion of it, together with the more transcendent claim which later in His ministry He publicly advanced, that roused the anger of the priestly class, and began to turn the drama towards its tragic conclusion. But there were yet nearly three years from the call of the apostles to the end, and it was only gradually during this time that the attitude of the actors in that drama worked itself out upon the lines already partly sketched.

The time of Jesus' public ministry, from the call of the apostles to His death, covered a period of three years, or, according to a different view, of two years and a few months. It falls, in any case, between the spring of A.D. 26 and the Passover of A.D. 29; and it was spent mainly in Galilee, with a journey into the region of Tyre and Sidon, and (according to St. John) visits to Jerusalem. Its record shows, on the one hand, constant labour both in teaching and in healing; and, on the other, frequent collisions with the scribes and Pharisees. His persistent exaltation of the spirit and comparative neglect of the form was the underlying cause of their enmity towards Him, which blazed out on occasions when, as in performing works of healing on the Sabbath day, He ran counter to their dearest traditions. The suggestion that form was the servant, not the ruler, of man's highest life, and that the Sabbath was made for man, not man for the Sabbath (Mark 2: 27), was to them blasphemy. From time to time they brought Him test questions, and on one occasion the case of a woman who, according



Samaria.

(Photo by Palestine Exploration Fund Committee.)

singular compelling attraction and dignity in Jesus, an attraction which must also have been at work in the case of Levi or Matthew (Matt. 9: 9). Not of the scum of the earth, this man must yet have been one to whom money seemed the root of all good, since he held a post so reprobated by his countrymen; and yet he left his money-making at the call of a penniless Jew. And these cases were probably representative of the way in which the other disciples joined their fortunes to His. He inspired a very strong personal love; and, more than this, He represented to these His followers the embodiment of the highest which they had yet seen, a spiritual force which gradually took shape in their minds as being a revelation of God Himself. And this character in Him left them no choice, as it were, but to leave all and follow Him.

aspect of Jesus was less comprehensible to the populace than His aspect as a healer of physical ills, or as a possible saviour of the nation; and it was to His increasing emphasis upon it that the disaffection of the people before His death may be traced.

But there was yet another respect in which Jesus differed from the teachers who filled Hebrew history—namely, He assumed an unprecedented authority. It was implicit in His whole bearing—

'He taught them as one having authority' (Matt. 7: 29); it was explicit in His emendations and His endorsements of Moses' law, in His defiance of tradition, in many statements sown up and down the narrative. The conviction that in His own person He could supply all the world's need, and that all power in heaven and in earth was His, went strangely with the surrender of the ordinary interests of the self. But

to the law of Moses, should have been stoned. He answered them by suggesting that he who was without sin among them should first cast a stone at her. When the retreating procession of discomfited elders had left them alone, His words to the woman were merely, 'Hath no man condemned thee?...Neither do I condemn thee: go, and sin no more' (John 8:2-11).

An attitude so defiant, and at the same time so hard to cope with, could not go unpunished. But while the Pharisees were nursing their wrath against Him, His work went on unhindered. His method of teaching the crowds who followed Him was mainly the method of parable, as that appealing most effectively to the general mind. It was His disciples who received the more direct teaching, such as that gathered up in the 'Sermon on the Mount.' His whole body of teaching, though a unity scarcely admitting of division, may be considered under a few of its ruling ideas.

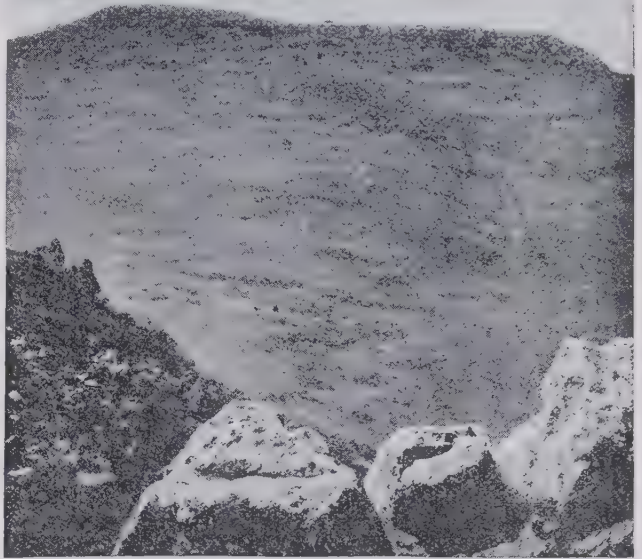
1. *The Kingdom of Heaven.* This represented something which to possess was infinite gain, and to miss was infinite loss. It was like a pearl of great price, like a treasure hid in a field, to own which a man might well go and sell all that he had. It was a thing whose beginnings were small, like a lump of leaven, a grain of mustard seed, but whose growth was strong and sure, until the leaven had leavened the whole, and the seed had become a tree, in whose branches the birds of the air took shelter. The possession of this priceless thing was offered to all, but not all proved themselves worthy of it; the seed was sown upon good ground, but also upon ground where it found little root, and where soon it withered away. (See parables of the kingdom, Matt. 13.) From the individual point of view this 'pearl of great price' may be expressed as a progressively realized harmony between the soul and God. But the 'kingdom' had also its denotation, covering a society whose members should share that harmony, and which should become a very 'kingdom of God' on earth.

2. *God's attitude towards man.* It is an attitude like that of Fatherhood. To God the individual is of unmeasured worth; like the single sheep that has strayed from the flock, he is sought until he is found, and 'there is joy in the presence of the angels of God over one sinner that repenteth' (Luke 15). Again, the outcast with a spark of 'faith,' of thirst for and trust in God, is nearer to Him than the self-righteous man: the publican is

justified rather than the Pharisee (Luke 18:9-14); the prodigal son brings more joy with him than the elder brother.

3. *Man's responsibility: (a) Towards God.* This involves the recognition of His Fatherhood, and fulfilment of the duty deduced from it: 'Be ye therefore perfect, even as your Father which is in heaven is perfect' (Matt. 5:48). (b) *Towards man.* His teaching on this subject was summed up by His follower Paul as, 'Bear ye one another's burdens' (Gal. 6:2). Jesus Himself described man's whole duty in its twofold bearing as implicit in this double commandment: 'Thou

them exhibit in practice the theory of the importance of the individual; they were performed for the benefit of the individual, and often of individuals of very little importance to the world, and that in an age when the individual *per se* stood very low in the scale of worth. (3.) Though the miracles of healing were in each case called out by compassion for an immediate need, Jesus regarded them as also of the nature of signs, which should carry conviction that the power of God was at work. This is wholly distinct from any effort to win the popular suffrage by the mere display of marvels, a



Mount of Beatitudes, or Horns of Hattin.

(Photo by Palestine Exploration Fund Committee.)

shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind.... and thy neighbour as thyself' (Matt. 22:37-40). Man's duty to man could not be neglected with impunity; in the day of reckoning judgment was to be passed on men according to their performance of it (Matt. 25:31-46).

Side by side with His teaching, the records give a history of miraculous works performed by Jesus. These exhibit certain marked features, among which are:—(1.) His miracles were never performed to secure any advantage to Himself; the principle adopted at the time of the temptation was rigidly adhered to. (2.) The greater number of

method which Jesus studiously avoided (Matt. 12:38, 39).

The miracles of Jesus may be grouped thus:—(1.) *Nature miracles.* Among these are the turning of water into wine at Cana; the calming of the storm on the Lake of Galilee; the feeding of five thousand with five loaves and two fishes. (2.) *Miracles of healing: (a) physical,* as when He gave the blind their sight; and (b) *mental,* as when He cast out 'evil spirits' from those regarded as possessed. (3.) *Raising the dead,* in the cases of the son of the widow of Nain, the daughter of Jairus, and Lazarus.

Discussion of the various hypotheses offered in explanation of the miracles of Jesus is here im-

possible. But it may be questioned whether an adequate explanation of these miracles in the terms of modern knowledge is of the first importance. The significance of Jesus to the world has developed so greatly on lines with which science has nothing to do, either in affirmation or in negation, that while every accretion to our knowledge of Jesus as a historic character is of value, it is not apparent that a scientific

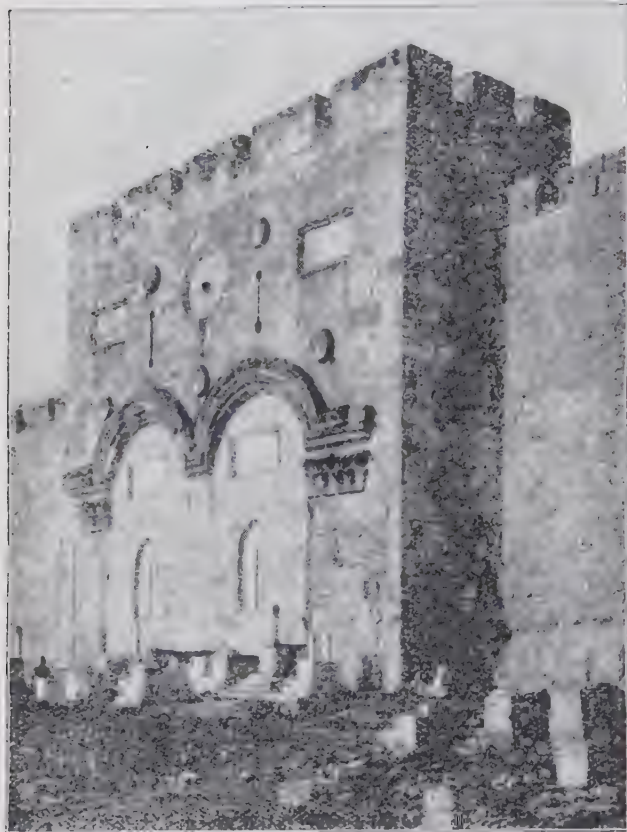
He went up into a mountain to pray' (Matt. 14:23, etc.) is an expression which punctuates the narrative. This was His refuge in all the crises of His life—e.g. at the time of His farewell to His disciples, and immediately before His arrest. His life involved a great strain, and it is evident that He can have received no stimulus adequate to meet it from those around Him, who only attained slowly to the most ele-

of a shared life and a shared task; and, at the close, of gladness at the thought of return to a home and an intimacy known before, and of confident surrender of those who were His charge into hands which He knew. So much, at least, lies upon the surface of the narrative.

The last stage of that history of which the foregoing is only a bird's-eye view moved with swift certainty to its close. The synoptists give no reason for dating Jesus' last journey to Jerusalem earlier than a few days before the Passover; but St. John (7:2, 10) notes that He went to Jerusalem for the feast of Tabernacles (Oct. 28 A.D.), and records no departure from its neighbourhood after that date. The consequent conclusion that Jesus had lately spent at least a number of weeks in that neighbourhood makes the violence of feeling against Him more explicable than if it had arisen wholly from earlier encounters, and from the report of His doings in Galilee.

The story of His last weeks is filled with characteristic work and teaching. Among the incidents noted are the healing of a blind man; the interview with the young ruler, who could not bring himself to the renunciation of his earthly goods, and with Zaccheus, who in great measure made that renunciation; the driving of the money-changers from the temple; and the incident of the widow's mite. In this period was included also the raising of His friend Lazarus from the dead, an incident the noise of which went far to confirm the Sanhedrin in their intention of putting Jesus to death.

Three days before His arrest the popular enthusiasm flickered up suddenly and for the last time (Matt. 21:1-11). The crowds who had assembled for the feast went to meet Him as He rode into Jerusalem, carrying palm branches and crying 'Hosanna,' as in honour of a king. But the flame sank as quickly as it had arisen, and it was in the company of His friends alone that He spent His last days. The net was being drawn closely round Him, and He knew it; after Judas had made his bargain with the priests, nothing but recantation or flight could have saved Jesus. The words given in John 14-16 were a deliberate farewell to His friends. He told them that His separation from them would not be final, rather that His union with them would be even closer after His death, for He would come to them anew; and, more than this, the very spirit which had dwelt in Him should dwell in them. Their last meal together was to Him symbolic in its ele-



The Golden Gate, Jerusalem, the traditional Scene of the Triumphant Entry of Jesus.

(Photo by the Photochrom Co., Ltd.)

explanation of His miracles would in any substantial way affect His influence over men.

Only one more of the points most prominent in the record can be noted. In studying the question of His inner life—difficult because so little treated by His biographers—one conclusion emerges with convincing force: He depended for stimulus and for strength upon times of withdrawal into lonely places, where, it is recorded, He prayed. 'And

mentary comprehension of His thought. On the other hand, it is equally evident that He felt the constant drain upon His strength supplied by prayer, and by it alone. Those of His prayers which find a place in the narrative show a sense of oneness with God unknown in the records of prayer, and, parallel with this, an absence of the sense of smallness, of imperfection, which is likewise unknown. In this relationship there appears the sense

ments of the coming sacrifice of His life. That surrender had, merely from the standpoint of cause and effect, become inevitable. He had outraged the prejudices and challenged the powers of His day, and those powers must necessarily have their revenge. But there is no question that in the mind of Jesus there was dominant the sacrificial idea. He went voluntarily to His death, speaking of it prophetically, moving towards it in an unswerving line, and facing it as one who was giving His life 'a ransom for many.' This aspect of His death was taken up by His followers—by St. Peter, and with especial force by St. Paul—and for the early church it was full of the highest significance. And throughout the ages the church has striven to express, in forms that have changed with thought, this idea which Jesus, with His unerring religious instinct, enshrined for ever in symbol.

After the supper He went with His disciples to the garden of Gethsemane. The record holds only fragmentary echoes of what passed there; His disciples knew no more, for 'their eyes were heavy,' and they slept while He was going through His hour of bitterness. Though He clearly looked beyond His death to the triumph of His cause, there was at this time a great darkness upon His spirit. His arrest by the officers of the temple, led by Judas, took place in the same garden. He was led to the palace of the high priest, and there underwent the first part of His trial. He was examined, according to the synoptists (Matt. 26:57-67), by Caiaphas, the high priest, and according to St. John (18:13, 24), first by Annas, late high priest and father-in-law of Caiaphas, and then by Caiaphas himself. The facts that the examination was conducted at night; that at first it was, if only for that reason, not fully public; that it preceded the production of witnesses; that, on the insufficiency of the evidence first heard, the charge was not dropped; and that no witnesses were called for the defence—were all, there is reason to believe, infringements of the Jewish law, and strengthen the suspicion that the death of Jesus was predetermined by the high priest. It is apparent from St. Luke (22:66) that the examination before Caiaphas during the night was only preliminary to an examination, begun at day-break, before the Sanhedrin. The crime of which Jesus was accused was His claim to be the Messiah and the Son of God, with, apparently, a subordinate charge of hostility to the most venerable institutions of the nation. His

answer to the high priest's question, 'Art thou the Christ, the Son of the Blessed?' was without hesitation in the affirmative: 'I am; and ye shall see the Son of man sitting on the right hand of power, and coming in the clouds of heaven.' This assertion, which stirred the anger of the assembly, and was declared by Caiaphas to be blasphemy, was a deliberate step on the way to death. Condemning Him with one consent, they carried Him to Pilate, the Roman procurator, in whose hands lay the final passing of the death sentence. While it is apparent that the Hebrew law was grossly wrested to hasten and secure the condemnation of Jesus by the Sanhedrin, it is clear also that the condemning party were in one sense substantially, though not formally, within their rights.

towards the emperor—a charge based on the claim of Jesus to kingship, and on a direct falsehood to the effect that He had been found 'forbidding to give tribute to Cæsar.' Pilate, after a fruitless attempt to transfer the responsibility of the sentence to Herod, tetrarch of Jesus' native province, examined Jesus as to the nature of His claim to kingship. Jesus explained that it was a kingdom 'not of this world.' He had indeed come to be a king, but it was through bearing witness to the truth that His end was to be attained. Pilate found no treason there, and would have released Him. But the pressure put upon Pilate was strong, and attempt after attempt, first to acquit Him, and then to find some compromise or loophole of escape for Him,



The Garden of Gethsemane.

The Hebrew state was a theocracy, and to preserve unchallenged the supremacy of Jehovah was the first duty of those who under Him ruled the nation. The injustice lay in the violation of the most express and emphatic provisions of the law at the bidding of an animus which is obvious, and especially in awarding to a claimant the punishment due only upon the proved falsehood of His claim. To advance such a claim falsely was an insult and a menace to the theocracy; but that in the mere advancement of the claim there was nothing criminal is clear from the fact that the appearance of a true claimant was the daily expectation of the people, who sought Him in every new prophet that arose.

To gain from Roman justice the desired capital sentence, it was necessary to alter the charge against Jesus to that of treason

was foiled by the Jews. To the end Pilate maintained the innocence of Jesus, and when he finally yielded it was clearly under the pressure of fear. The cry of the Jews, 'If thou let this man go, thou art not Cæsar's friend,' was full of peculiar menace to Pilate, owing both to the political circumstances of the time under Tiberius Cæsar, and to his own position. His sense of justice gave way before it, and Jesus was condemned to be crucified.

The attitude of Jesus throughout His trial is noteworthy. His refusal even to answer Herod, who sought only signs and wonders from Him; His willingness to explain Himself to Pilate when the latter honestly inquired; His effort to put him upon his conscience and make him be true to himself; and, finally, His refusal to explain Himself further when He sees the bent

of Pilate's mind towards a dishonest surrender—all are as characteristic as the absence of any sign of wavering in the course which He had chosen.

The history of the six hours during which Jesus still lived upon the cross does not lend itself to brief description. That night His body lay in a tomb belonging to Joseph of Arimathea, a Pharisee, who was yet one of His disciples; and the

among whom was Mary Magdalene, reported the tomb of Jesus empty, and called Peter and John, who visited it and confirmed their testimony (John 20:1-10). More than this, Mary Magdalene met in the garden one whom not immediately, but in the course of conversation, she recognized to be Jesus (John 20:14). The same day two of His disciples, going to Emmaus, were joined by one whom in the same way they knew

by the Lake of Galilee seems to have had as its especial object the renewal of the friendship which Peter had so tragically betrayed when, in the hall of Caiaphas, he denied Him thrice (John 21). Whether or not the threefold assertion of love which Jesus drew from Peter bore reference to Peter's threefold denial of Him, the meaning of the interview for Peter was the indication of a way of service by which he could retrieve his fall from loyalty. And Peter's complete deliverance from that fear which had before been his undoing, is one of the most impressive facts in the history of the early church.

Two of the biographers of Jesus record in their closing words His farewell charge to His disciples, and His ascension into heaven, after which He was seen no more by them on earth (Matt. 28:16-20; Luke 24:50, 51).

The appearances of Jesus after His death have been in all ages a main subject of study and discussion. Of all the considerations which must be taken into account in such study, two only can be very briefly indicated here. First, the experiences were shared by persons of widely different temperaments, and sometimes by considerable numbers at the same time: according to St. Paul (1 Cor. 15:6) 'He was seen of above five hundred brethren at once.' The fact that the consciousness of His presence was shared by so many lifts the evidence, at the lowest estimate, to a much higher level than that of merely individual testimony. Secondly, within a few weeks after the death of Jesus, His disciples suddenly exhibited a courage and a spiritual vitality unknown to them before; they began to sway men, and to carry everything before them, somewhat after the manner of their Master. The change is remarkable enough to demand explanation; and in seeking it, the testimony of those in whose consciousness it took place claims at least examination. This testimony was to an intercourse with Jesus carried on during a period of forty days after His death; to a promise of the bestowal of His own spirit upon them, and to the fulfilment of that promise on the day of Pentecost; and finally, to a sense that in truth He abode with them, communicating strength and conferring authority.

Intimately bound up with the question of His influence upon His disciples is the subject of the claim which Jesus undoubtedly made to a unique relationship with God—a relationship which He commonly expressed as sonship, but sometimes as identity of being. In connection with it one or two obvious points, be-



Pilate's House, and Tower of Antonia.

little group who stood near the cross had seen the end of all their hopes. The way in which those hopes were rekindled is of great interest. On the morning of the second day following the death of Jesus, several of His friends had experiences of a wholly unexpected kind. The narratives do not agree as to the exact form and order of these experiences, but from them the following essentials may be gleaned. Early in the morning certain women,

after a time to be Jesus (Luke 24:13-31). That night a company of the disciples, assembled within closed doors, saw Jesus, who stood among them and entrusted to them new powers and a new commission (John 20:19-23). Eight days later He appeared to them again, and convinced Thomas, who had not been present on the last occasion, that it was indeed Himself whom they saw (John 20:26-29). Another appearance of Jesus to His disciples

sides some already touched upon, claim notice. First, the sense of this relationship, and of an authority derived from it, is a dominant factor in a consciousness against which the charge of a lack of sanity cannot easily be brought. Unless, in short, the claim of Jesus is to be regarded as a 'delusion of grandeur,' the possibility of its truth must be entertained. Among the points which must be noted in considering the probability of such a delusion are His balance, stability, and strength, and His lack of self-assertion in the obvious ways. In His teaching He constantly pointed to Himself, as in 'I am the way, the truth, and the life,' and kindred utterances; but it was expressly the Divine principle which He believed to be in Himself for which He claimed allegiance, and 'the Father' from whom it came, for whose honour He was jealous. Secondly, the claim was recognized by Peter, and most probably by some at least of the other disciples, before the death of Jesus; and this in face of a heavy weight of tradition, by virtue of which the 'Anointed' was to be of a type widely different from Jesus. Later, the truth of the claim was to them both the *raison d'être* and the guarantee of their mission, and in support of it they went willingly to death. Their personal impression of Him was the immediate basis of their belief, but it is probable that the impression of completeness, spiritual and moral, which Jesus made upon His contemporaries helped to confirm them in it. In connection with this impression must be considered the story of the birth of Jesus, as being the result, not of ordinary physical process, but of Divine agency, which was widely received among the early Christians, and has passed into a tenet of the church. It is given by two of the four biographers (Matt. 1, 2; Luke 1), and should be examined in the light of the fact that it first appeared, not as a proof of the supernatural character of Jesus, but as an explanation of a personality which was felt to need explanation. Finally, this claim to a Divine character has been the foundation stone of the Christian church, and the history of that church cannot justly be considered apart from it. That history is one of many thousands of minds in all ages to whom Jesus has been a vivid reality, and who have seen Him in some or all of many characters—as their saviour of life, their light and inspiration, their saviour from sin and their mediator with God, their human friend and their revelation of the Divine.

'To many of them the whole of life was expressed in terms of Him; to them, as to St. Paul, 'to live was Christ.' The attitude of mind resulting from this possession by the thought of Jesus has been remarkable. Ordinary considerations have been obliterated; thousands of these men and women have gone gladly to torture and to death, merely in defence of His reputation. Some, who have found in Him their inspiration, have risen to heights of extraordinary sanctity, and graciousness, and power; in them there has died away all sense of conflict between their own interest and that of their fellows, and with a greatness of heart growing very like that of Jesus, have learned to identify their 'self' with humanity.

The influence of Jesus upon all these souls, with their reaction upon their times, must therefore be taken into account in any attempt to estimate the significance of Jesus to the world. That significance, regarded from the purely historical point of view, may be examined in two aspects—*viz.* the character of His contribution to religion and to ethics, and the influence exerted by that contribution upon the world.

(1.) His contribution to religion, in its briefest statement, was the assertion of the Fatherhood of God as a fact, not for one nation only, but for humanity, and of the worth to Him of the individual man; of spiritual values as the only values; and of the continuance after death of the life which has associated itself with God. His ethics were emphatically the ethics of the motive rather than the act; for Him love was 'the fulfilling of the law.' With this idea is associated also the whole character of His method, which had not a little to do with the magnitude of His service to the world. He brought no formulated moral code. His aim was to communicate a spirit, to develop a certain attitude of mind in men, not primarily to teach them what in this and that case they ought to do. He taught rather after the manner of an artist than a moralist. He took by storm men's hearts through their love of the beauty of the spirit, and so set that spirit in the unwilling citadel which no moral battering-ram and no terrors of the wrath to come could have conquered. And the gates were opened to the new ideal, and the strong man armed was bound, before the new disciple fully knew the trend of his feeling and his heart. And here lay the newness of the method of Jesus, in that He worked with, instead of against, that law of human nature according to which a man does

well only that on which his whole self is bent. Instead of imposing a moral imperative, He inspired an enthusiasm which carried the will with it; and it was thus, as the author of *Ecce Homo* has said, that He trained His followers to be 'a law unto themselves.' His method succeeded with the mass, where the ethics of the schools succeeded only with a few; the white heat of goodness shining out from a person lighted other fires, where the light of the unembodied ideal burned alone like a solitary torch. It was the 'return to nature' in His method which gave it its power and its permanence. But the passion which Jesus sought to arouse was emphatically not a thirst for personal holiness alone, but a thirst for the highest well-being of the race—an enthusiasm of humanity which sought a good which could only be realized socially. He aimed at the foundation of a society whose solidarity in itself should be complete, and whose solidarity also with Himself He compared to the solidarity of the vine and the branches. The necessity of that solidarity to the society's success was based on His claim to embody in Himself the power of God.

(2.) The influence of that contribution has become, from its very universality, almost impossible to estimate. Modern modes of thought, at least as regards the relation of man to man, have been so far moulded by the ideas of Jesus that the very mind which judges is too full of His contribution to realize its magnitude. Viewed historically, there was little in the record of Jesus' life to prophesy that magnitude. But after His death history shows an unexpected phenomenon. It shows a sect whose founder has just died a malefactor's death, and whose members, in the depths of confusion and despair, are practically hiding for their lives; it shows this sect in the sudden possession of a vigour wholly unexplained, defying every display of force which threatened it, and gathering new converts every day. More than this, the sect is seen spreading through Asia Minor, invading Italy, and establishing in the very city of the Cæsars a throne which has never yet been overturned. Yet this was only the beginning of a development which, in the eyes of any student of it, must remain a testimony to the sum total of Jesus—His personality, His ideals, and His methods—which places Him first among those who have influenced men and made history.

His influence has penetrated far beyond the pale of the church which bears His name. A common modern idea of God, held by many



*'Christ in Gethsemane. By H. Hofmann.
(Copyright of the Berlin Photographie Co.)*

who acknowledge no peculiar authority in Jesus, has been built of materials contributed by Him. There had been those before Him in the Gentile world who taught a monotheism; but it was without assurance as to the possibility of conscious relationship between man and the Deity, and it was Jesus who brought to the Gentiles a monotheistic belief in which that assurance was implicit.

But it is in the region of ethics that His influence has been most penetrating. It would not be legitimate to attribute to Him without reserve the whole difference between the world of decadent paganism in which He lived and the world of to-day. There have been at work other forces, whose scope it is impossible accurately to define; and it is possible that, apart from Jesus, men might to some extent have attained to an interpretation of the world in terms of spirit, to a belief in the supreme value of goodness, and to a more humane attitude towards their fellows. But the student of history is compelled to ascribe to Jesus a very large share in producing a change of moral attitude so profound and far-reaching. It was He who first introduced that principle of bearing one another's burdens upon which the whole modern philanthropic attitude, the whole body of feeling in favour of the weak, the poor, and the oppressed, is founded. In His day, except for instances of spontaneous kindness, these classes were left to care for themselves. It is His attention to the sick, the outcast, and the poor which has educated that feeling of responsibility for such which is now so powerful throughout the civilized world. The process has been one of education; and the ideas which, logically followed out, must develop into the principles of emancipation and religious toleration, were slow in finding their fulfilment. But it is unquestionably the ideas of Jesus which have brought society to the point where the realization of these principles becomes inevitable. It is due to Him that public sentiment on matters of morals has grown so strong that an ethical judgment for or against a policy has become a useful platform argument.

But any estimate of the influence of Jesus upon the world must remain inadequate, because of the comprehensiveness and strength of that influence. For the most striking feature of Jesus, viewed in His relationship to the world, is His success—success that stands unrivalled, and beside which the other successes of history are small. It has been the belief in all ages of those to

whom He has been the dominating influence that this success is the success of a personality in whom God was made manifest. But even if, ignoring this belief, judgment is passed on His success alone, and on the mark which He has made upon history, He stands alone in unquestioned right to that high title which was His own choice: 'I am the light of the world.'

Literature.—The subject has drawn round itself a vast literature, of which it is possible to name only the more outstanding works, a few being added for the purposes of the general reader.

(1.) Lives of Christ. The earliest formal biography was the *Vita Christi* of Bonaventura, but the modern scientific method may be said to have been first applied in Herder's *Erlöser der Menschen* (1796), and *Gottes Sohn, der Welt-Heiland* (1797). Paulus (1828) is rationalistic and barren, preserving the husk and rejecting the kernel; but he gave the impetus to Strauss (1835, trans. by Marian Evans—George Eliot; popular recast 1864, trans.), whose theory of 'myth' surrenders the husk and keeps the kernel—i.e. the eternal truths enshrined in the gospel narratives. After Strauss all the greater 'Lives' deal largely with critical aspects—e.g. Neander (1837; trans. 1851), Lange (1839; trans. 1864, edited by Marcus Dods), Schleiermacher (1864), Keim (1869-72; trans. 1873), Weiss (1882; trans. 1883-4), Beyschlag (1885-6), Oscar Holtzmann (1901; trans. 1904), of which the last is the most pronouncedly anti-supernatural; Rosegger, *I.N.R.I.* (1905; imaginative but discerning), Stewart's *The Infancy and Youth of Jesus* (1905), and Smith's *The Days of His Flesh* (1905). French: Renan (1863; trans. 1864), who gives an artistic non-scientific sketch, which however often approaches caricature; Pressensé (trans. 1866); Reville (1897). English: Farrar (1874; popular and a marvellous success); Cunningham Geikie (1876; also a *New Short Life*, 1898), Robertson Nicoll, *Incarnate Saviour* (new ed. 1897); Edersheim (1883; much valuable matter from Jewish writings); Stalker (new ed. 1891; popular, but able and solid); Andrews (American; also Edin. 1892); Sanday (concise discussion in Hastings's *Dict. of the Bible*, also separately).

(2.) Teaching of Jesus Christ. J. R. Seeley, *Ecce Homo* (1865, anonymously; no criticism, non-supernatural, but deeply spiritual); the New Testament Theologies of Weiss (1868, trans. 1882-83), Beyschlag (1891, trans. 1895), G. B. Stevens (1901, New Testament Handbooks), H. J. Holtzmann (1897), give an excellent presenta-

tion of the subject; Bruce's *Kingdom of God* (1890); Wendt (1892; trans. of vol. ii. of *Lehre Jesu*, 1886-90). See also Stier's *Words of the Lord Jesus* (1843-8; expository); Trench, Bruce, and Jülicher on the Parables.

(3.) Doctrinal. See the subject of Christology in works on dogmatic theology; Ullmann's *Sinlessness of Jesus* (1829, trans.); Baldensperger's *Selbstbewusstsein Jesu* (1888); Fairbairn's *Christ in Modern Theology* (1893); Stalker's *Christology of Jesus* (1899); Denney's *Death of Christ* (1902); and Pfleiderer's *The Early Christian Conception of Christ* (1905).

(4.) Historical and Archaeological. Delitzsch's *Jesus und Hillel* (1867); Ewald's *Hist. of Israel*, vol. vi. (1868; trans. 1883); Schürer's *Geschichte des Jüdischen Volkes* (1886-7; trans. 1885-90); Meyer's *Jesu Muttersprache* (1896); Dalman's *Worte Jesu* (1898; trans. 1902); Stalker's *Trial and Death of Jesus Christ* (1894); Ramsay's *Education of Jesus* (1902).

Jesus Sirach. See ECCLESIASTICUS.

Jet is a kind of lignite or brown coal, which is rendered black by fossilization and by impregnation with bituminous matters. It burns with a smoky flame, breaks with a conchoidal fracture, is easily cut, and takes a fine polish. Some specimens, when examined under the microscope in thin sections, show the cellular structure of fossil wood. Formerly much jet was extracted from the dark bituminous shales of the Upper Lias near Whitby in Yorkshire. It is also obtained in the department of Aude, in France, in the amber-bearing clays and sands of N. Germany, and in several other places. Only the harder kinds are of any value. It is cut into brooches, earrings, beads, and other ornaments, and was at one time in Britain, and is still in Spain, Turkey, and other countries, much used as mourning jewellery. Jet ornaments were valued in early times. Imitations of jet are made from vulcanite or celluloid, or from black wax covered with glass.

Jetsam. See FLOTSAM.

Jetton, or **JETON**, a piece of metal or other substance stamped and formerly used as a counter in card games, as well as a ticket of entry to the tables.

Jeune, SIR FRANCIS HENRY. See ST. HELLIER, BARON.

Jeunesse Dorée, LA, was one of several derivative terms applied to the band of young Parisians who strove, after the execution of Robespierre in 1794, to carry out a reactionary policy, opposed to that of the revolutionists. The name is used in a general sense to denote young dandies living a life of gaiety and frivolous pleasure.

Jever, old tn. in grand-duchy of Oldenburg, Germany, 36 m. by rail N.N.W. of Oldenburg. The 'fathers' (*Getreuen*) of the town used to give Prince Bismarck a birthday gift of 101 plovers' eggs. Pop. (1900) 5,486.

Jevons, WILLIAM STANLEY (1835-82), English political economist and logician, born at Liver-

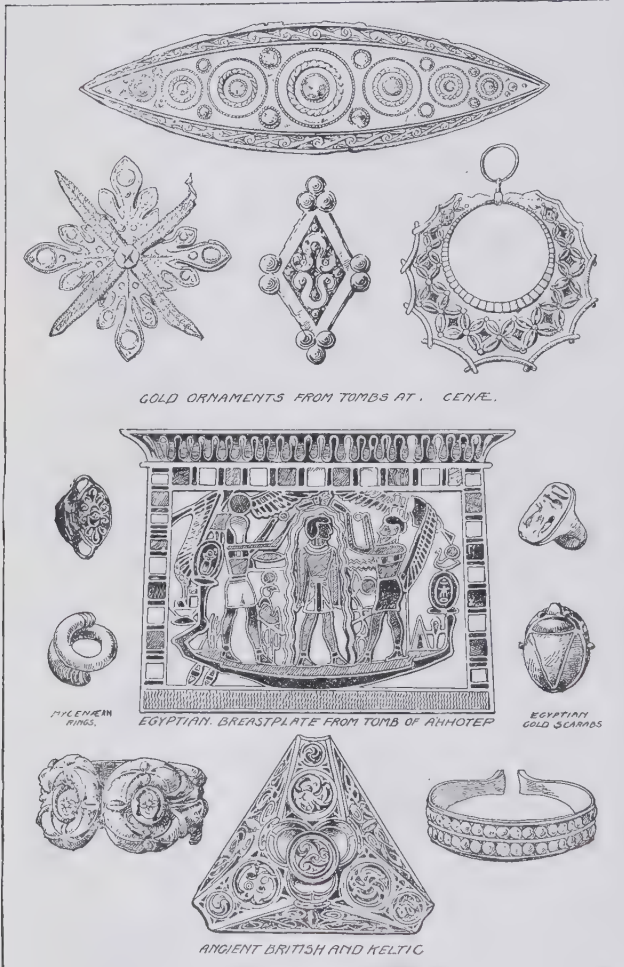
pool. Assayer in the mint of Sydney (1854-9), he returned to England, and became professor at Owens College, Manchester (1866). In 1876 he accepted the professorship of political economy at University College, London, but six years later was drowned while bathing near Hastings. A powerful logician, Jevons was yet more widely known as an

economist through his *Theory of Political Economy* (1871), his work on *The Coal Question* (1865), and *The State in Relation to Labour* (1882). Among his philosophical works is *The Substitution of Similars* (1869), *Elementary Lessons in Logic* (1870), and *The Principles of Science* (1874), his most important work on logic.

menian bishop in 1228. The Jew was, it is stated, a doorkeeper in the palace of Pontius Pilate. In 1547 he turned up at Hamburg, giving his name as Ahasuerus, and declaring that he had been a shoemaker in Jerusalem, and had refused to allow Jesus to rest at his door when He passed it bearing the cross. He struck Jesus, who replied, 'I will stand here and rest, but thou shalt go on until the last day.' The 'Wandering Jew' subsequently visited Brussels as Isaac Laquedom, and also Leipzig, Lübeck, Moscow, Madrid, and Hull. One of the most notorious of the impostors was Michob Ader, a scholar who knew several languages, and whose record appears in *The Turkish Spy* (1644). Another adopted the name of Battadeus. The legend was probably suggested by a similar class of myths of deathless saints and heroes, including Enoch, Elijah, Arthur, Charlemagne, Barbarossa, Tell, not forgetting Cain, the 'Wild Huntsman,' and the 'Flying Dutchman.' The legend has been poetically treated by Goethe, Schlegel, Schubert, Shelley, Croly (in *Salathiel, the Immortal*), and 'Monk' Lewis, and by Sue in his famous novel. See Quinet's *Ahasuerus* (1833), Paris's *Le Juif Errant* (1880), and Conway's *Wandering Jew* (1881).

Jewel, JOHN (1522-71), bishop of Salisbury (1560); author of *Apologia pro Ecclesia Anglicana* (1562). Jewel was a lecturer at Oxford at the accession of Queen Mary, but fled to Germany during the Roman Catholic revival. He returned under Elizabeth, by whom he was nominated to his bishopric. He was one of the first of those defenders of the English Church, against Rome on the one hand and Puritanism on the other, who are known as Anglicans. See *Life* by Le Bas (1835).

Jewellery. In the citadel of Mycenæ certain curious lentoid gems of onyx, agate, serpentine, etc., have been found at a great depth. They bear intaglios of animals of an archaic type, but showing in many cases an advanced art. Bronze seal-rings with intaglio engravings were found in the palace at the same famous site, dating probably as far back as 468 B.C. Among other treasures of the goldsmith's art were crosses (leaf-shaped) and plates of gold richly ornamented with a great variety of designs in *repoussé* work. The jewellery of the middle and of the new empire in Egypt exhibited rare technique and beauty of design, as exemplified especially by the wonderful jewels found on the body of Queen A'hôtep, one of which, a breastplate, is composed of strips of gold and interspaces of paste



Specimens of Ancient Jewellery.

pool. Assayer in the mint of Sydney (1854-9), he returned to England, and became professor at Owens College, Manchester (1866). In 1876 he accepted the professorship of political economy at University College, London, but six years later was drowned while bathing near Hastings. A powerful logician, Jevons was yet more widely known as an

See *Letters and Journals* (with bibliography) edited by his wife (1886).

Jew, THE WANDERING. The first mention of the legend of the Jew condemned to wander till the day of judgment for offering insult to Christ on the way to Calvary is ascribed to Matthew of Paris, who professes to have received the fable from an Ar-

and coloured stones, technically akin to the Chinese *cloisonné* work. In the Celtic area, during the bronze age and subsequently, solid gold ornaments, such as torques, armlets, earrings, and lunettes, represent the perfection of taste, and, as in the case of the unique Hunterston brooch, reveal a delicacy of handiwork and a knowledge of the goldsmith's craft unsurpassed by any modern examples. See Schliemann's *Troyns* (1886), *Mykenæ* (1878), etc.; and Erman's *Life in Ancient Egypt* (1894). See also the articles on GEMS AND PRECIOUS STONES, GOLDSMITHS' AND JEWELLERS' WORK AND SILVERSMITHS' WORK.

Jews, HISTORY OF (from 70 A.D.). The early history of the race is dealt with under ISRAEL. With the fall of Jerusalem and the triumph of Titus, the enslaved race was hurried into Italy, Spain, and even France, with the greatest centre of settlement at Rome, a powerful colony at Cyprus, and another of later influence at Alexandria. Nevertheless Palestine remained till the 5th century the centre of Jewish thought. Jochanan ben Zaccai, who escaped from besieged Jerusalem, promulgated the policy for which the rabbis had been long preparing, and which kept the Jews alive during all succeeding centuries. The dispossessed nation should make the law (Torah) its supreme possession, subordinating to it flag, land, passion, learning, and knowledge. With this motive the Sanhedrin was established at Jabne, subsequently moved to Galilee, and finally set up in Tiberias, until the centre of power was shifted to the schools in Pumbaditha in Babylon. The chief of the rabbis, the leadership falling to the house of Hillel, became recognized as the *de facto* chief of Israel, and thus the state within a state, rather more developed subsequently in Babylon, was set up. Instead of indulging in incendiary leadership, the rabbis began the codification and writing down of the oral interpretation of the law. The Mishna grew out of Hillel's code, and the Gemara was superimposed on the Mishna, so that the output of theological disquisition—the practical issues of which were codified by Joseph Caro in the *Shulchan Aruch*—exceeded all other forms of Jewish literature until recent date. That this sometimes acrimonious and often mere dialectical material did not at once proceed from out the mass of the people is shown by the contrast between the placidity of rabbinic literature and the national policy of the fettered race. But this theological legislation may be regarded as an attempt to translate national

policy into the religious ideal, and to transfer the simple social customs and habits of Palestinian life into the usages, practice, and ritual of a landless Judaism. Nation and religion became inextricably interwoven, and to give the exile the simulacrum of the old life, the broad Jewish ideals were spread out into a thousand details, and the Pharisaic code became a *pragmatica*, the power of which is not even broken to this day, but has indeed been extended by the ingrowth of new customs in the old rubric.

The exiled race, chafing under its burdens and embittered by the insults of Hadrian, rose under Bar Cochba (132-3), and guided by Akiba, the scholar and mystic, held the Roman power at bay for one moment. Even then the spirit which sought to re-achieve possession of Palestine was not crushed. The belief in restoration by revolt lasted till the time of Chosroes the Persian, who took Jerusalem in 614, but was defeated in his turn by Heraclius. The Jews suffered at the hand of Christian and heathen alike; but when the church became the right hand of the state, their lot worsened considerably, for Constantine was ruthless in his zeal for the new faith, and everything was forbidden to the Jews except baptism.

With the fall of the Roman empire the Jewish position was changed. The patriarchate had moved to Babylon, Palestine had become the land of pilgrimage, and the mass of the Jews moved into the Germanic states, whose loose confraternity legalized the last form of independence still held by the Jews—that which gave them the right to settle their disputes before their own tribunals. The bishops made every effort to use the state against the Jews, but the rulers found the Jews useful financially. About the dawn of the 10th century the Jews were rising to the utmost of their European position. They had settled in small numbers in England, more in France, and held a position with ever-advancing splendour in Spain. A period of literary brilliance and scholastic effort followed, and the great rabbis cluster round and about the period of the crusades. In Jewish records the years of the crusades are all black letter, for the onward march of the warriors who were to capture Palestine for Christendom was marked by the wholesale slaughter, torture, and pillage of the Jewish communities, especially in the Rhenish provinces, some of which end their history in the 12th century and only recommence it in the 19th. The desolation wrought by the cru-

saders was followed by the invention of the infamous 'blood accusation,' first associated with 'Hugh of Lincoln,' and still believed in by the ignorant peasants of Europe in our own times. The position of the Jews grew rapidly worse, for from the middle of the 13th century the persecution began to take an official shape: the badge or hat was discovered; the separation and isolation of the Jews was planned; and finally, in 1290, the Jews in England, who had contributed freely to the exchequer by the payment of special taxes, and had 'seen much tortured and mulcted by John and Richard, were expelled the kingdom. France adopted the same conduct in 1395, and the Inquisition having done much to break up the solidarity of the Spanish communities, the Spanish Jews were expelled on the 9th Ab (destruction of the temple anniversary) 1492, the year in which Columbus discovered America. The expulsion from Portugal followed three years later; and thus the Jews settled more and more in the Holy Roman empire, particularly in Germany, Italy, and continuous territory, and accepted the offers of the Turks, who welcomed them to Constantinople and the chief cities of Islamic power.

The Sephardim—as the Jews of the Iberian peninsula are named in Hebrew—settled, however, in considerable numbers in Holland; and excepting there, Jewish life was now penned within narrow walls, in areas which were not enlarged for centuries, and in some instances remained wholly unchanged until the 19th century.

The great outpouring of Hebrew poetry from the pens of the Spanish galaxy, of whom Jehuda Halevi is best known, ceased; and while the Jews devoted themselves to fresh commentaries on the Talmud, and the rabbis to new theological *responsa*, the Talmud was being burnt in the market-places, and Jewish books were confiscated in every possible way. The living centre gradually moved to Amsterdam, and between the Dutch and the Italian presses the whole literary outpouring of the century is divided. The Jews welcomed the reformation and the printing-press, and they spread gradually again through the French provincial towns, and in the 'spacious days' of Elizabeth first came back to England, though permission to return dates from Cromwell's dealings with Carvagal the Intelligencer and the better known Manasseh ben Israel (1657). The religious Jewish world, which had been but infrequently perturbed by new

internal issues (polygamy was prohibited in 1050)—for neither the creation of the Karaitic community nor the affairs of the legendary kingdom of the Khosars affected the people—was, however, affected just at the moment when the general European renaissance came to its height. Spinoza in Holland promulgated his new theories, and was banished from the synagogue; but more widely affecting still was the uprising of the Smyrniote Sabbathai Zevi (b. 1626), who, as the new Messiah, led the Jews of Eastern Europe and the Orient, and received the sanction and support of the hard-headed Jews of the continental bourses. Sabbathai made an ignominious failure, which included his conversion to Mohammedanism; but the whole Jewish world was unsettled and perturbed. Chasidism took root at the time Moses Mendelssohn (1727-86) was following Frankel to Berlin, and the English Parliament passed and cancelled the bill for the naturalization of the Jews (1753). Although the Jews had entered France in 1580, and Berlin at the end of the 17th century, the great mass of the Jews were living in Poland, preserving the old German patois; and thus, still removed from the great centres of life, but devoted entirely to Jewish lore, they fell easy victims to the mysticism of Isaac Baal Shem, who, as 'Master of the Name,' threw over the Talmud, and gave the Zoharistic interpretation its value by the aid of his visions and his miracle-working pabulum. Chasidism with its communistic ideas took root, and still dominates the Jews in Galicia; and the Frankist movement, another pseudo-Messiah, was possible in 1770. Frederick the Great of Prussia, who, however, believed that the oppression of the Jews never brought prosperity to any government, began to treat them less severely in 1750; but at that date, from the beginning of the Ghetto period, the Jews had been *servi camerae*, protected by the king, whose body-servants they technically were, and who used them mostly to provide him with money.

In the middle of the 18th century the Jews were already intellectually divided geographically, those in the west of Europe being more advanced than those in the east; but the latter were the chief guardians of the old Jewish literature, and thus German Jewry conserved itself by the aid of Polish teachers. It was to cover this incongruity that Mendelssohn began the Germanization of Judaism, and thus gave the name of the newest era in Judaism; though it is safe to

say that in his translation of the prayer-book he did not foresee that reform in America which holds Sunday services, or discusses the advantage of the Sunday Sabbath, with a separate but correlated offshoot in the ethical culture movement promulgated by Dr. Felix Adler, first trained to minister to Temple Emanuel in New York. It is a far cry from the legalism of Gamaliel and Judah the Prince, the commentaries of Rashi, to the results which followed the secession in the Hamburg community in 1814, when the Jewish camp was split into orthodox and unorthodox; but the movement is historically traceable through the rationalizing of Maimonides, whose *Guide to the Perplexed* is still opposed in certain parts of Russia, and whose attempt to find the line of agreement between Judaism and Aristotelism smoothed, though obscurely, the path for the ultimate modernization of the old faith. While, however, the religious ferment was in process, the Jews were still more occupied with political affairs. Joseph II. began the enfranchisement of the Austrian Jews in 1783, and in 1793 the Paris Assembly, thanks to Mirabeau, emancipated the French Jews—an act which was reaffirmed by the Constitution of 1795, nineteen years after the Jews had received formal leave to re-enter France, though they had been there from the 16th century, and helped to give Alsace to the French empire. A year later (1796) the Jews in Holland were, somewhat to their own unwillingness, granted complete citizenship. The rise of Napoleon brought a Jewish Sanhedrin (1805) into existence; but apart from antiquarian interest, its chief importance lies in the fact that it resulted in the French rabbis becoming (1831) state functionaries, and that a certain legal standing was given them afterwards in Germany and in Russia, where the crown rabbi has nothing to do with the religious life of the Jews.

Another period of Jewish greatness was to set in with the Rothschilds as financiers, Crémieux (1796-1879) as statesman, Moses Montefiore (1786-1886) as philanthropist, and Rappaport (1790-1867), Lunz, Geiger, Jost, and Grätz (historian) as the founders and organizers of the scientific study of Jewish literature, and the Solomons and Goldsmids in England to fight the battle of emancipation. The Reform Act of 1832 gave the Jews the right to vote, and an act of 1858 gave them the right to sit in Parliament. Meanwhile, the religious needs had called into being the

first of the rabbinic synods (1844) and the founding of a rabbinical seminary in Breslau (1854), thus marking a break with the Jesuitism in Russo-Poland. The Jews in Rome, who were not allowed to leave the Roman ghetto without permits till 1847, benefited from the succession of the house of Savoy. The founding of the German empire (1871) completed the release of the German Jews. Switzerland, which under French influence dealt hard with the Jews, emancipated them in 1874; while the Austrian emancipation had been completed in 1868. Meanwhile, Spain and Portugal offered to welcome back the Jews; and in 1879 the Berlin treaty granted emancipation and equality to the Jews of Roumania. The only serious breaks in this forward movement from the French revolution was the Damascus blood accusation in 1842 and the famous Mortara kidnapping case. The heyday of freedom was, however, short-lived. Bismarck found himself opposed by Jews; a succession of German Jewish politicians—Edward Lasker, Ludwig Bamberger—and theorists such as Carl Marx and Ferdinand Lasalle, were springing up, and the Germanic idea which sought a new world supremacy found in the Jews an irritant though chauvinistic population. The revival of the blood accusation in Hungary, which had always been tolerant to the Jews, followed by the refusal of Roumania to enfranchise the Jews, led to local outbreaks of some importance; but all this was in turn overshadowed by the attack on the Jews in Russia (1881-2). The Russian Jews had been confined to the Polish areas in which the Casimirs ruled them. The incursion of the Cossack chief, Chmelnitzki (1660), had been the example for many assaults and legal oppressions; but while Nicholas I. kidnapped the Jewish children in order to make Christians and soldiers of them, Alexander II. did much to improve their lot, and offered them opportunities to assimilate with their neighbours. Under Alexander III. the Balta riots were followed by the May Laws, which restricted Jewish life in every direction, the Russian Church standing sponsor for the persecuting of what to it were heretics. There followed an emigration westward, the immediate consequence of which was the making of the now great American Jewish community, and infiltration into all European countries, including the British Isles. The Russian attack gave nerve to the German anti-Jewish preachings of court-chaplain Stoecker, whose successor was Ahlwardt; and, not to

be outdone, the cry of 'Juiverie' was raised in France. Drumont, whose work had papal support. This movement spread amongst the pan-Germanic element in Austria, where Rohling refurbished the blood accusation. Thus, in 1894 the Jews had come back to a mediæval position in Europe. There had been fresh outbreaks in Russia (1890-1) of a severe type; anti-Semitism was embittering the always hard lot of the Jews in Galicia; the Roumanians became more and more intolerant towards the Jews; and the anti-Jewish spirit spread to Algeria, where Crémieux had given the Jews freedom. The French agitation came to a head in the famous Dreyfus case, and the suggested massacre of all the Jews in France; in Austria, in the dissolution of the Liberal party and the ascendancy of the anti-Semitic faction, with members in the Reichsrath, and Lueger as burgomaster in Vienna, notwithstanding imperial objection. Year by year the position worsened; for while the Dreyfus drama was being played out in Paris, the blood accusation was raised at Xanten in Germany, and at Polna in Bohemia, besides in many other places. The Jews were successfully assaulted in Prague, in Vienna, in the smaller towns of Galicia, and in Bucharest, the offenders remaining unpunished; and the Roman Catholic Church kidnapped children in Austria, the Araten case (1899) being the most prominent of the series. Saxony and Switzerland prohibited the Jewish method of slaughtering cattle; and the question of expelling the Jews from Germany was ineffectually raised in the Reichstag, and the papal organs joined in the Jew hunt. In the United States the anti-Jewish feeling took a merely social form—the blackballing of Jews from leading clubs, boycotting them in society, refusing them in high-class private schools and in hotels. In 1901 a distinctly, though disguised, anti-Jewish campaign was begun in London with a view to prohibit the immigration of Jews, who, owing to the Russian, Roumanian, and Galician persecutions, were compelled to leave these countries. Three attempts were made to relieve the Jewish situation. Crémieux, after the Damascus incident, founded the 'Alliance Israélite Universelle' (1860), with a view to uniting the Jews all over the world, to ameliorate the condition of their co-religionists in persecuted lands; and the sister groups were the Anglo-Jewish Association (1871), and the Austrian and German alliances. These organizations found the greater tasks

beyond their capacities, and so became educational agencies for fostering education in the Orient. In 1891 Baron Maurice de Hirsch founded the Jewish Colonization Association with £2,000,000, and to it bequeathed the greater portion of his wealth. With a view of aiding emigration from Russia, colonies were founded in Argentina, in Brazil, in the state of New Jersey, and in Canada, but the principal importance was attached to the Argentina scheme. No notable success, but some considerable failures followed, and at Baron de Hirsch's death the scheme was enlarged, and partook of more general ameliorative work distributed throughout the world.

From the centre of Russia, however, there had sprung up an idea, after the first riots, advocating emancipation out of Russia; and the idea attaching itself to the old Jewish dream of restoration, crystallized into the formation of the Chovevi Zion (Lovers of Zion) associations, which gradually spread throughout Europe. Under its auspices Roumanian and Russian Jews wended their way to Palestine and set up agricultural colonies, the lead having been set by Pesach Tikvah (1878). Baron Edmund de Rothschild supported these plans; the Jewish population of Palestine speedily doubled, and settlement was continued amidst considerable hardship and but small success. The colonies devoted themselves largely to viticulture. The Sublime Porte had, however, interdicted Jewish immigration into Palestine in 1892, out of fear of a Russian advance, and this checked the movement considerably. Just, however, when the restoration idea had resolved itself into a philanthropic and sentimental movement, the idea was revived (1896) in the most intense form by the promulgation of 'the Jewish state' by Theodor Herzl of Vienna. The Jewish state, as the only solution of the now pressing Jewish question, became the Jewish state in Zion, and thus the Zionist movement was formed. Supported by several young men and many of the old lovers of Zion, the new movement pressed forward on modern lines; and despite the open opposition of the wealthy classes and the majority of the Western rabbis, the Zionists reunited the scattered elements of Jewry at the first Zionist congress, held in Basel, Switzerland (1897). The old nationalistic sentiment was revived, a Jewish 'flag' was raised, organizations were established throughout the world, and a financial corporation—the Jewish Colonial Trust, a national fund for the purchase of land—was called

into existence. At the sixth congress, held at Basel in August 1903, Dr. Herzl announced that the British government had offered to facilitate the sending of a commission to inquire into the practicability of establishing an autonomous Jewish settlement in the E. African Protectorate; but at a subsequent congress the projected scheme was abandoned. In 1905 the Jews throughout Russia were again the objects of unprovoked attack and indiscriminate slaughter during the period of unrest which followed the close of the Russo-Japanese war. At the present time (1905) the number of Jews in the world is estimated at some 11,013,000, of whom 8,743,000 are in Europe, and 1,556,000 in America. There are about 278,200 in the British empire. For the language and literature of the Jews, see HEBREW LANGUAGE, MISHNA, MIDRASH, TALMUD. See Graetz's *History of the Jews* (Eng. trans., 6 vols. 1891-8), Jost's *Geschichte des Judenthums* (10 vols. 1820-47), Cassel's *Manual of Jewish History* (Eng. trans. 1902), Dean Milman's *History of the Jews* (new ed. 1887), Th. Reinach's *Hist. des Israélites* (1884), Wellhausen's *Geschichte Israels* (4th ed. 1901), A. Leroy-Beaulieu's *Israël chez les Nations* (1893), Edersheim's *History of the Jewish Nation* (1896), *Jewish Encyclopedia* (1901, etc.), and Protocols of Zionist Congresses (i. to vi.) in Vienna.

Jew's Ear, or **JUDAS'S EAR**, is a fungus (*Hirneola Auricula-Judas*) which grows on the elder tree. It has somewhat the form of the human ear; and as the elder is traditionally said to have been the tree on which Judd hanged himself, the popular name was given to the fungus.

Jew's Harp, a musical instrument, perhaps so named because Jews introduced it into England. The 'Jew's harp,' or 'Jew's trumpet,' as it is sometimes called, consists of a small piece of iron of horse-shoe shape, with a slender tongue of steel, which is made to vibrate. The instrument is held between the parted teeth, and the projecting end of the tongue of steel is twanged with the forefinger.

Jew's Mallow (*Corchorus olitorius*), an African annual plant belonging to the order Tiliaceæ; it grows to a height of about 18 in., and bears long, sharply-toothed leaves. The young leaves are used as a salad. In Britain the plant can only be grown under glass.

Jew's Thorn. See PALIURUS.

Jex-Blake, SOPHIA (1840), born in Sussex. In 1858 she was appointed mathematical tutor of Queen's College, London, but studied medicine, and founded (1874) a school of medicine for

women in London, and in Edinburgh (1886); has held many medical appointments, and is the author of *The Practice of Medicine by Women* (1876), *The Care of Infants* (1884), and *Medical Women* (1872 and 1886).

Jeypure. See JAIPUR.

Jezebel, a city of Canaan, situated on a western spur of Mt. Gilboa. Ahab made it a royal residence (1 Kings 21:1), and it was the scene of the murder of Naboth (1 Kings 21), as also of the tragic end of Ahab's dynasty (2 Kings 9, 10). The city gave its name to the valley of Jezebel, and also to the plain of Esdraelon. The former is associated with several important events of Old Testament history, such as Gideon's triumph over the Midianites (Judges 6:33 f.), and the defeat and death of Saul in battle against the Philistines (1 Sam. 29). The plain of Esdraelon (or Megiddo) was the scene of Deborah's triumph over the Canaanites (Judges 4, 5), and the defeat of Josiah by Pharaoh Necho (2 Kings 23:29 f.). See G. A. Smith's *Hist. Geog. of Holy Land*, xix. (new ed. 1897).

Jhalawar, feudatory state in Rajputana, India. Area, 3,043 sq. m., and population (1901) 90,175.

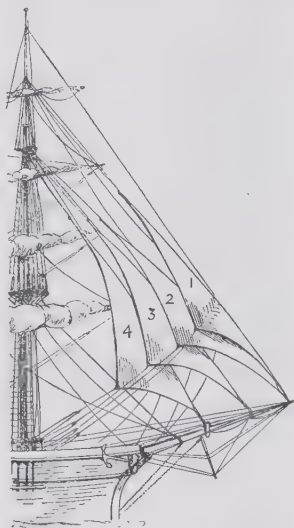
Jhang, munic. tn., Jhang dist., Punjab, India, 90 m. N.E. of Multan. Founded in 1462, it was once the capital of a Mohammedan power. Pop. (1901) 24,382. The district has an area of 5,871 sq. m., and population (1901) 378,695.

Jhansi, walled tn., Allahabad div., United Provinces, India, 60 m. S.E. of Gwalior. During the mutiny of 1857, the sepoy garrison massacred the Europeans, and in April of the following year Sir Hugh Rose recovered the fort and town. The fort, on a rocky eminence commanding the city and surrounding country, is now in British hands. Pop. (1901) 55,724. The district has an area of 1,640 sq. m., and population (1901) 616,759. Jhansi Naabad, adjoining the above city, is the administrative headquarters of the district. Pop. (1901) 3,000.

Jhelum, or JEHLAM (also known as Bitasta, the *Hydaspes* of the ancients), a riv. in the Punjab, India, the most westerly of the five streams which give that province its name. It rises in the mountains of Kashmir, flows S. and N.W. for about 100 m., passing Islamabad and Srinagar, then takes a S.W. course, and enters the plain of the Punjab about 250 m. from its source; after a further course of 200 m., it joins the Chenab below Kadirpur. It abounds in fish, and is navigable for river craft for the greater part of its course. Its length is about 490 m.

Jhelum, or JHILUM, munic. tn., cantonment, and headquarters of the Jhelum dist., Punjab, India, on the R. bk. of the Jhelum, and 60 m. S.E. of Rawal Pindi. Pop. (1901) 14,951. The district has an area of 3,995 sq. m., and population (1901) 594,018.

Jhering, RUDOLF VON (1818-92), German jurist, born at Aurich in East Friesland; held professorships at Basel (1845-6), Rostock (1846-9), Kiel (1849-51), Giessen (1851-68), Vienna (1868-72), and Göttingen (1872 till his death). He set forth a fresh view of the spirit of Roman law, as furnishing the basis of a new and adapted system of jurisprudence, and was renowned for the independence and clearness of his thought. Among his works are *Geist des römischen Rechts auf den verschiedenen Stufen seiner Entwicklung* (1852-65), *Der Kampf ums Recht* (1872; Eng. *Battle for Right*, 1883), *Der Zweck im Recht* (1877-83), and *Jurisprudenz im täglichen Leben* (1870; Eng. trans. 1904). See M. de Jonge's *Rudolf von Jhering* (1888), and *Life by Merkel* (1893).



The Jibs of a full-rigged Ship.

1, Jib topsail; 2, flying jib; 3, jib; 4, fore topmast staysail.

Jib, the foremost sail of a ship, being a large staysail extended from the outer end of the bowsprit, prolonged by the jibboom, towards the fore topmasthead. In cutters the jib is on the bowsprit, and is extended on the lower masthead. A 'jibboom' is a continuation of the bowsprit, run out to extend it in the same way as a topmast is rigged on a lower mast. A 'flying jib' is a sail set forward of, and in addi-

tion to, the jib, and extended on a boom rigged out beyond the jibboom. A 'middle jib' is a sail sometimes set in addition to the jib and flying jib, being extended from the end of the jibboom, while the jib is extended from it further aft—i.e. nearly half-way down, or on the boom.

Jibuti, JIBOUTI, or JIBUTIL, seapt., French Somaliland, 40 m. N. of Zeila, has a good harbour, and is the starting-point of the railway to Harrar. The chief exports are coffee, skins, ivory, and live stock. Pop. 15,000.

Jicin. See GITSCHIN.

Jiddah. See JEDDA.

Jig, a species of dance tune of a merry buoyant character. It is usually written in $\frac{3}{4}$ time; but Bach, Handel, and other early composers, who frequently introduced the *giga* into their suites, wrote it in various times, such as $\frac{3}{4}$, $\frac{4}{4}$, $\frac{3}{8}$, etc.

Jigger. See CHIGOE.

Jihun. See AMU DARIA.

Jijona, picturesque city, prov. Alicante, Spain, 14 m. N. of Alicante; produces dessert grapes and a sweetmeat of nuts (*turrón*) much eaten in Spain. Pop. (1900) 6,901.

Jilolo, or HALMAHERA, island of the E. Indies, between Dutch New Guinea and the N. of Celebes. Its area is 6,650 sq. m., and its population about 30,000. It consists of four long, narrow peninsulas, each traversed by a mountainous backbone from 3,000 to 4,000 ft. high. Sago, rice, coconuts, dammar, and other products are grown. Jilolo is divided between the sultans of Tidore and Ternate, both subject to Holland.

Jimena de la Frontera, tn., Cadiz prov., Spain, 20 m. N.W. of Gibraltar; has manufactures of leather, flour, and esparto grass rugs. Pop. (1900) 7,549.

Jimenes. See XIMENES DE CISNEROS.

Jind, tn., cap. of native state of same name, Punjab, India, 75 m. N.W. of Delhi. Pop. (1901) 8,047.

Jingoism, a term used in politics to express the more extravagant forms of imperialism when it develops into militarism and aggression. In continental politics the same extravagance is called chauvinism, being generally associated with a kind of fire-eating politician; while in America the same idea used to be called 'Spread-Eagleism.' The term dates from the outburst of national feeling against Russia in 1878.

Jinn, a class of supernatural beings in Arabian mythology, created out of fire 2000 years before Adam. There are good and bad jinn, the latter being subject to Eblis. The Afrits, most powerful of all evil spirits, form

a class by themselves. Although the jinn are above all the usual laws of nature, man can control them by means of talismans; thus Solomon held them all entirely in subjection. The old French translators of the *Arabian Nights* used *génie* (familiar spirit) to represent the Arabic word.

Jiron, tn., Santander, Colombia, 45 m. s.w. of Pamplona, noted for its gold mines, tobacco, and cattle. Pop. 10,000.

Jitimor, or ZHITOMIR, tn., W. Russia, cap. of gov. Volhynia, 85 m. s.w. of Kiev. It is the seat of an orthodox and a Roman Catholic bishop; manufactures tobacco, soap, candles, bricks, gloves, dyes, spirits, and has an important grain trade. Pop. (1897) 65,452, nearly one-third of whom are Jews.

Jivaros, or JEVEROS, S. American people of the Upper Marañon; were reduced by the Spaniards after the conquest of Peru, but revolted in 1599. They have fixed homes, cultivate several economic plants, and possess the secret of mummifying human heads, which in the process are reduced to about the size of a large orange, without losing the features and expression of the living subject. Their language is sonorous, clear, and of simple structure, but has no words for the numerals above five.

Jizzak, tn. and fortress, prov. Syr Daria, Russian Turkestan, 115 m. s.w. of Tashkent. This fortress played an important part in the Russian conquest of Bokhara (1866-8). Pop. (1897) 6,250.

Jmudes, or ZHIMUDES, name given by Russians and Poles to the Lithuanians of the Baltic littoral, in opposition to the Lithuanians proper, lying farther east.

Joab, the most famous of the three sons of Zeruiah (the sister of King David of Israel) and the commander-in-chief of the army. His bravery and military skill were great; thus, he led the assault which resulted in the capture of Zion, and conducted successful campaigns against Syria, Edom, and Ammon. His career is stained, however, by his treacherous murder of Abner and Amasa, and the part he played in the matter of Uriah. On the other hand, his slaying of Absalom (2 Sam. 18: 1-14) was politically justifiable, though (with other offences) it cost him the royal favour, his office, and eventually his life, as David on his deathbed gave solemn injunctions to Solomon to put him to death. Benaiah, his slayer, succeeded to the chief captaincy under Solomon.

Joachim, JOSEPH (1831), Hungarian violinist, was born at Kittsee, near Pressburg. His principal teacher was Boehm of

Vienna, but for some years he also studied classical works with David at Leipzig. He became leader of the grand-duke's band at Weimar (1849), director of concerts at the court of Hanover (1854-66), and in 1868 was appointed director of the high school for music at Berlin. He made his first appearance in London in 1844, and since then has made an annual visit to Britain—in recent years also bringing his famous Berlin quartet. Though possessing an unsurpassed technique, his natural predilection for classical music—fostered during his stay in Leipzig by the influence of Mendelssohn and Schumann—has led to his becoming an incomparable exponent of classical works for the violin. As a teacher and founder of a system of violin technique he is equally famous. His compositions include overtures, concertos, pieces for violin and piano, etc., but his greatest work is his Hungarian concerto (op. 11) for violin and orchestra. See his *Life* by A. Moser (1899), and Maitland's *Joseph Joachim* (1905).

Joachimsthal, decayed mining tn., Bohemia, Austria, at the foot of the Erzgebirge, 17 m. N. of Karlsbad. The first thalers (*Joachims-thalers*) were struck here in 1519. Pop. (1900) 7,378.

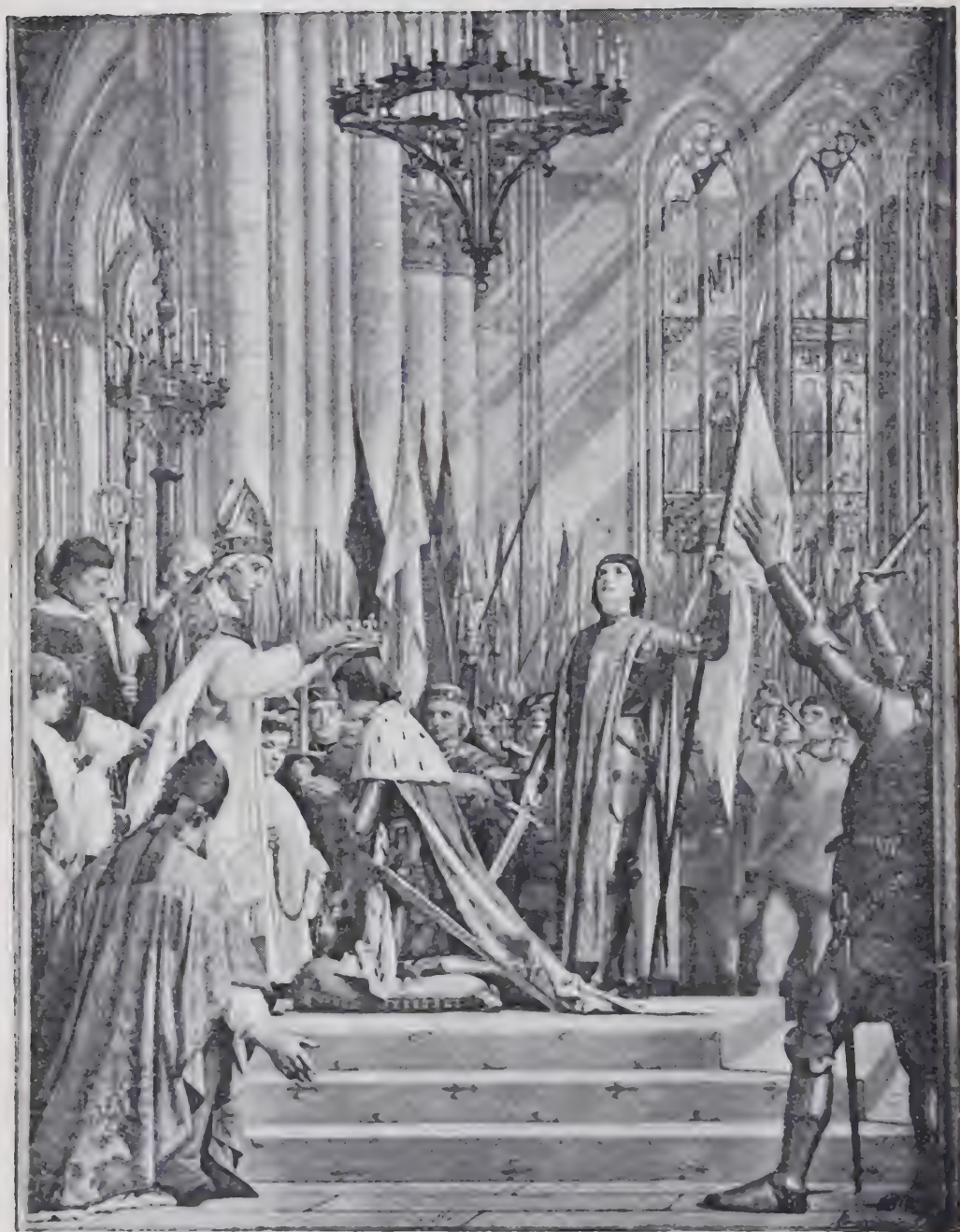
Joan, POPE, a woman, born at Mainz or Ingelheim, who, passing herself off as a man, became a professor in Rome, and, on the death of Pope Leo IV. in 855, was elected his successor as John VII. Some accounts make her an Englishwoman. The story was first mentioned by Stephen de Bourbon (d. 1261), who apparently got it from a Dominican source. The Dominicans and Minorites had a grievance against the papacy in the 13th century, owing to their harsh treatment by Innocent VIII. That Pope Joan was a fictitious personage was fully proved by Dr. Döllinger. See Döllinger's *Fables respecting the Popes of the Middle Ages* (Eng. trans. 1871).

Joan, 'THE FAIR MAID OF KENT' (1328-85), was the daughter of Edmund of Woodstock, son of Edward I. She appears to have formed a liaison with the Earl of Salisbury, and then to have married Sir Thomas Holland. She became Countess of Kent (1352), and on Holland's death, having married the Black Prince (1361), she became the mother of Richard II.

Joan of Arc (?1412-31) was born at Domrémy, some miles s.w. of Nancy. From the age of thirteen she constantly heard voices, and believing herself called to be the deliverer of France from the English, she sought out the Dauphin at Chinon. Many, among whom were the Dominicans, showed

hostility to her and her patriotic enthusiasm. She secured, however, the confidence of soldiers like Dunois and Alençon, and the king allowed her to join a force which was to endeavour to introduce supplies into Orleans. Dunois's account of the success of the expedition, and of Joan's triumphal entry into the beleaguered town, is most graphic. The day following Joan defeated the English under Talbot; and on May 8, 1429, the English were in full retreat. Orleans was thus relieved, and before long the region of the Loire was practically clear of the enemies of France. Joan distinguished herself again at the taking of Jargeau and in the battle at Patay. She was now determined to have Charles crowned at Rheims. Troyes yielded to the French, and the way to Rheims was clear. On Sunday, July 13, 1429, Charles was crowned king of France. But her desire to bring about a reunion of Burgundy with the king of France, and her endeavour to take Paris, were defeated by the hostility of the duke and by delays on the part of the king's advisers. In her attempt to rescue Compiègne, then besieged by the Burgundians, she was captured in May 1430 and sold to the English. After being imprisoned at Rouen and treated with great brutality, Joan was eventually brought to trial on Jan. 9, 1431. The trial was a mere mockery of justice, and Pierre Cauchon, bishop of Beauvais, supported by the University of Paris, procured her condemnation as a sorceress and a heretic. On May 30, 1431, she was burnt to death. See Mrs. M. Oliphant's *Jeanne d'Arc* (1896); Quicherat's *Procès de Condamnation et Réhabilitation de Jeanne d'Arc* (5 vols. 1841-50); Luce's *Jeanne d'Arc* (1886); Fabre's *Jeanne d'Arc* (1892); Murray's *Jeanne d'Arc* (1902).

Joannes Damascenus, known also as Chrysorrhœos ('the golden-flowing'), theologian, hymn-writer, and one of the later Greek fathers, was a native of Damascus, and flourished during the first half of the 8th century A.D. He entered the lists of controversy with the Emperor Leo, in defence of the worship of images. His later years were passed in the most stringent self-discipline in the monastery of Santa Saba, near Jerusalem, and he died c. 754. Of his works, which are little more than compilations, the following may be mentioned: *Fons Scientiæ*, *De Imaginibus*, and disputations or dialogues directed against various heresies—e.g. Jacobites, Manichæans, Nestorians. His memory is best preserved by his hymns, several of which have been ren-



Joan of Arc: 'The Coronation of Charles VII at Rheims.' From the Painting by J. E. Lenepveu in the Pantheon, Paris.

dered into English by Dr. J. M. Neale. The best edition of his works is that of Le Quien (1712; reprinted 1748). See monographs by Langen (1879) and Lupton (1882).

JOASH, or JEHOASH. (1.) King of Judah (c. 836-796 B.C.), was the son of King Ahaziah. Saved from the truculence of Athaliah, his grandmother, Joash was crowned at her deposition, while only seven years of age. Under the wise guidance of Jehoiada he was instrumental in restoring the temple, which had fallen into sad disrepair under the idolatrous queen. But, according to the Book of Chronicles, his later years were stained by a relapse into idolatry, and by the murder of the high priest Zechariah. Penalty followed in the Syrian invasion, and in the king's assassination by two of his servants. See 2 Kings 11, 21; 2 Chron. 22-24. (2.) King of Israel (c. 798-782 B.C.), the son and successor of Jehoahaz. He was one of the ablest rulers and most daring warriors in the royal line of the northern kingdom. After an interview with the dying Elisha, Joash thrice defeated Benhadad of Syria, and also repelled an invasion led by Amaziah of Judah, took him prisoner, and pushed his victory as far as Jerusalem, which he captured. See 2 Kings 13, 14.

JOB, BOOK OF, forms one of the Kethubim ('writings') or Hagiographa of the Old Testament, and purports to narrate a lengthened episode in the life of a non-Israelite, Job, 'a man in the land of Uz' (? in the district of Edom). At Satan's instigation, and with God's permission, he suffers first the loss of his possessions and his family, and thereafter grievous bodily infliction, as a test of his faith and integrity, which, however, is successfully borne (ch. 1, 2). He then holds three cycles of long colloquies with his friends Eliphaz, Bildad, and Zophar (4-14, 15-21, 22-31). After the intervention of a fifth debater, the youthful Elihu (32-37), and an answer from God, with short interruptions from Job (38-42:6), the book closes with a description of Job's ultimate prosperity, all his former possessions being doubled, and a new family born to him. The first two chapters and the epilogue (42:7-17) are written in prose, all the rest in poetry. The design of the work is plain: it is an attempt to grapple with the problem of human suffering, more particularly that of the righteous. Job's three friends advocate the traditional view that suffering is penalty for sin, and therefore maintain that his calamities are the consequence and unmistakable evidence of an ungodly life.

There is, of course, sufficient truth about such a theory to make it tenable by a rational mind. In spite of the reproaches of his friends, however, Job continues to assert his integrity, and is convinced that even if the pure eye of God were to try him, he would come forth as gold (23:10), though in his self-defence he is betrayed into something perilously like an indictment of the Divine government. Theoretical solution of the difficulty there is none, but a sufficient practical one is found in Job's eventual submission to God's dealings, and the confession of his temerity. Isaiah 53 should be compared with the Book of Job, as throwing a fresh gleam of light upon the problem. Of the author (or authors) of the work we know nothing. According to Jewish tradition, it was written by Moses; modern critics assign various dates between the 9th and 4th centuries B.C. The general tone of the poetical portions agrees well with a period shortly after the captivity, when men were asking why those born in exile, and therefore not responsible for the evils of which it was the penalty, should yet continue to suffer. The speech of Elihu is generally regarded as a later insertion; and some critics suppose the prose prologue and epilogue to be earlier than the rest of the work (contrast the patience of Job in the second chapter with the murmuring spirit of the third), and that the great unknown poet and prophet used the ancient legend as the medium of his speculations. Note that none of the *dramatis personæ*, not even God, makes any reference to the part played by Satan, and that the concluding story, with its *ultra-poetic* justice, is really irrelevant to the point in debate. See Ewald, *Poets of the O.T.* (trans.); Delitzsch (1864, trans. 1866); Dillmann (1869); Budde (1876, 1896); Duhm (1897); Davidson, *Camb. Bible* (1884); Peake, *Century Bible* (1905); Cheyne's *Job and Solomon* (1887); and Froude's *Short Studies*, vol. i. (1878).

Jobber, a member of the Stock Exchange who deals in stocks and shares with the broker, and not directly with the public. When a jobber is asked to quote for certain shares, he names a double price (e.g. 2-2½), the first figure being the price at which he is prepared to buy, and the second that at which he is prepared to sell the shares, the difference between the two being the 'jobber's turn.'

Job's Tears, a name popularly applied to *Coix lachryma*, a species of grass, native of Asia, but sometimes cultivated in gardens in Britain. It derives its popular name from its large, white, tear-like fruits.

Jocelin, or JOSCELIN (fl. 1200), a Cistercian monk, who lived at Furness, and then at Down in Ireland. He wrote Lives of St. Patrick, St. Kentigern, and St. Waltheof of Melrose. Extracts also exist of his Life of David of Scotland, and of a Life of St. Helen, attributed to Jocelin.

Jocelin de Brakelonde (d. c. 1211), chronicler, a Benedictine monk of Bury St. Edmunds. In his *Chronica* he gives the history of the abbey while he was an inmate. It was edited for the Camden Society by J. G. Roke-wood in 1840, and was translated as *Monastic and Social Life in the Twelfth Century* (1843). See Carlyle's *Past and Present*.

Jockey. See RACE MEETINGS. **Jockey Club**. See HORSE-RACING.

Jodel, or JODELN, a manner of singing which consists of changing suddenly from the chest voice to the falsetto. It is much used by the Tyrolese in singing their native melodies, and is frequently introduced as a form of refrain after each verse of a song.

Jodelle, ETIENNE (1532-73), French poet, born at Paris. The friend of Ronsard and Du Bellay, he substituted classic plays for the mysteries and morality plays of the middle ages. His *Cléopâtre* (1552) brought him into connection with the French court. He wrote another tragedy, *Dido*, and a comedy, *Eugène*. A new edition of his *Œuvres* appeared in two volumes (1868-70).

Jodhpur, or MARWAR. (1.) The largest feudatory state of Rajputana, India; has an area of 37,000 sq. m. It possesses tin, lead, and iron; salt is manufactured at Sambhar Lake. Jodhpur revolted during the mutiny of 1857. Pop. (1901) 1,935,909. (2.) Capital of above state, 98 m. W. of Ajmere. The fortress, which contains several ancient palaces, stands 300 ft. high. The maharajah's palace lies to the N.E.; the British resident occupies the fine modern jubilee buildings. The Maha Mandir, or 'great temple,' lies to the N.E. Hardware and ivory are manufactured. Pop. (1901) 60,437.

Joel, whose book is the second of the 'minor prophets,' was the son of Pethuel. Nothing is known of his personality, but it is commonly accepted that he belonged to Judah; his thoughts centre around Jerusalem. The contents of his slight book may be grouped as follows: (1) ch. 1 to 2:17, description of a calamitous plague of locusts, and a call to repentance and prayer; (2) 2:18 to 3:21, Jehovah's promise of restitution at the 'day of the Lord,' which, however, will bring disaster to Israel's enemies. Some have understood the locusts in a figurative sense—i.e. as representing

some invading enemy—but the fact that the prophet compares them to men, and that their ravages are among the crops, not the people, rather favours a literal interpretation. The date is much canvassed: the traditional view was that Joel lived in the days of Joash, and accordingly must have been one of the first 'literary' prophets; but recent scholarship, arguing from the absence from the book of any reference to Assyria, to Israel (the northern kingdom), or to a king, combined with the mention of priests and fasts, tends to assign a post-exilic date. The style is pure and clear, but lacks the creative originality of Hosea or Amos. See vols. by Merx (1879); Driver, in *Camb. Bible* (1897); and works quoted under PROPHECY.

Johanna, or ANJOUAN. See COMORO ISLANDS.

Johannesburg, the largest city of the Transvaal Colony, British S. Africa, 30 m. s.w. of Pretoria. In 1886 its site was bare, open veldt (5,500 ft.); but the town grew rapidly, owing to its location on the Witwatersrand gold fields, the richest gold-mining district in S. Africa. In 1896 it was a busy town, 6 sq. m. in area, with a pop. of 8,000 Boers, 34,000 British, and 43,000 natives. Johannesburg is connected by rail with Pretoria, Delagoa Bay, Port Elizabeth, and Cape Town. It has broad streets, and contains many handsome government and other buildings. The fortress erected by the Boer government is now dismantled. On May 29, 1900, the town was quietly occupied by Lord Roberts. Pop. (1904) 160,017.

Johannisberg, castle (built 1722-32) in the Rheingau, Germany, on the S. slope of the Taunus, overlooking the Rhine, 3 m. N.E. of Rüdesheim. Its vineyards (52 ac.) produce the famous Johannisberger.

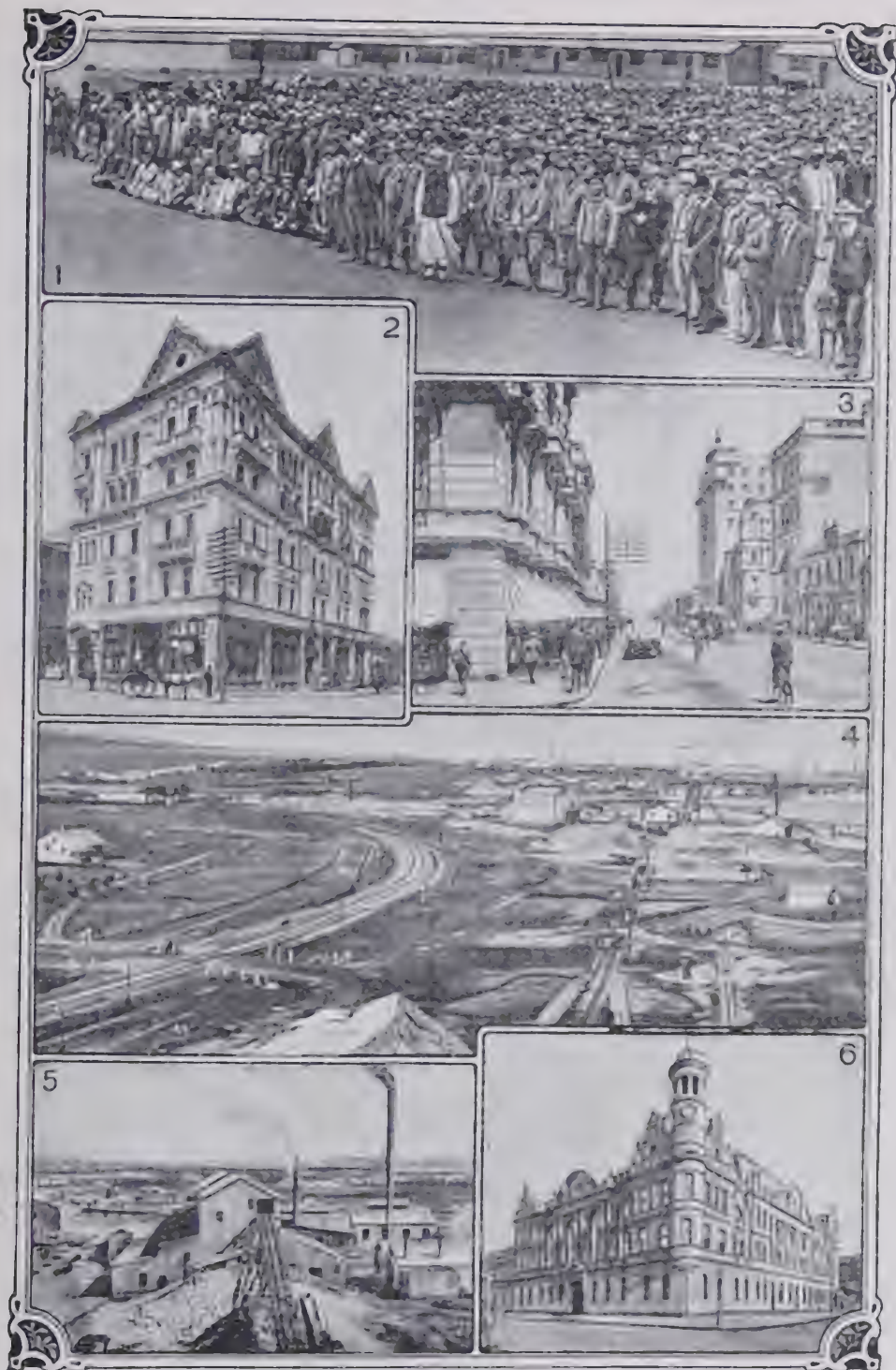
John, the Apostle, one of the disciples, and probably the cousin, of Jesus, was the son of Zebedee and Salome, and the brother of James 'the Great.' He was a fisherman at Bethsaida, near Capernaum, on the Lake of Galilee, and was there called by Jesus to the discipleship. Our Lord gave the two brothers the name Boanerges, 'Sons of Thunder,' probably indicating a certain impetuosity, or even arrogance, in their temperament, which called for occasional reproof (Matt. 20: 20 f.; Mark 9: 38 f.; Luke 9: 54 f.); but John became much changed, as might be expected of the 'disciple whom Jesus loved' (John 13: 23), and one to whom our Lord, when on the cross, committed the care of his mother (John 19: 26 f.). With Peter and James he formed an inner circle

of the disciples, who were admitted to more intimate relations with the Master. After the crucifixion he became a 'pillar' of the church at Jerusalem (Gal. 2: 9). He was banished to the island of Patmos (Rev. 1: 9), probably c. 68 A.D., and according to an ancient tradition, he spent his old age in Ephesus, where he wrote the Apocalypse, the Gospel, and the Epistles.

John, EPISTLES OF, three writings enumerated among the Catholic epistles, traditionally associated with the apostle John, and generally believed to be the products of a single hand. The First Epistle was written probably at Ephesus; its design is stated in 5: 13, 'that ye may know that ye have eternal life,' and it brings out very forcibly the two complementary truths—God is righteous, and God is love. In style, diction, and general cast of thought its resemblance to the Gospel of John is very marked, and some critics—e.g. Baur—have regarded it as a mere imitation of the latter. The more particular occasion of the epistle was the appearance, in the churches addressed, of some form of doctrinal error, the representatives of which, as denying the Messiahship of Jesus, are named antichrists (2: 22, 4: 3; cf. 2 John 7). By some this error has been regarded as a form of docetic Gnosticism, and some have also seen in the epistle traces of montanistic rigorism (e.g. 5: 16 f.). Hence many critics date the epistle at such a late period as to preclude its apostolic authorship. But the historical evidence in favour of its genuineness is very strong, quotations from it being found in Irenæus, Papias, Polycarp, and the Didaché (c. 100 A.D.). The Second Epistle is addressed 'to the elect lady and her children' (ch. 1), a phrase regarded by some as referring not to an individual but to the church generally (Hilgenfeld), or to some part of the church—e.g. Jerusalem or Philadelphia. Like the First Epistle, this contains warnings against false doctrines. The Third Epistle was sent to one Gaius, who lived near Ephesus, but is otherwise unknown. It is a request for hospitality on behalf of certain teachers who were about to visit his locality. These two letters, the shortest in the canon, are of great importance by reason of the light they cast upon the condition of the churches in early times. Some have believed that they came from the hand of John the Presbyter (Jerome), and they are not so well authenticated as the First Epistle. See commentaries by Hilgenfeld, *Evang. u. Briefe Johann.* (1849); Neander (1851); Rothe, 1st Ep. (1878); West-

cott (1886); Plummer, *Camb. Bible* (1886); *Pulpit Com.* (1889); Lias, 1st Ep. (1887); Weiss in Meyer (1888); Holtzmann in *Hand-Com. zum N.T.* (1893).

John, THE GOSPEL ACCORDING TO, from its position in the New Testament often called the 'fourth gospel,' differs so much in form and character from the other three gospels that it forms a class by itself co-ordinate with what may be called the synoptic tradition. (See GOSPELS.) It may be divided as follows: (1) the prologue, ch. 1: 1-18; (2) the testimony of the first witnesses to Jesus, and of various works and signs, 1: 19-4: 54; (3) further signs and conflicts with the Jews, culminating in their resolve to put Jesus to death, 5-12; (4) the final discourses and the priestly prayer, 13-17; (5) trial, crucifixion, resurrection, and various manifestations, 18-21. The work displays a clear and homogeneous plan, having all its parts organically connected with each other and with the whole; whereas the synoptics are rather of the nature of more or less discrete aggregates, so that a miracle more or less would not alter the character of, for example, Matthew (Holtzmann). John records surprisingly little of the historical matter found in the synoptic gospels—e.g. it has nothing about the birth, infancy, temptation, or transfiguration of Jesus, or His agony in the garden; nor does it contain any parables—but, on the other hand, it narrates several incidents, such as the raising of Lazarus, the absence of which from the others strikes us as strange. In the synoptics, the scene of the work of Jesus is principally Galilee, and He comes to Jerusalem only towards the end; in John the chief theatre of the gospel drama is Jerusalem, the Galilean ministry being merely episodic. The former give the 15th, the latter the 14th, of Nisan as the day of the crucifixion. A remarkable contrast appears in regard to the Messiahship of Jesus: according to the synoptists, there is a progressive development in Jesus's consciousness of His Messianic calling, culminating in the express assertion and recognition of it at Cæsarea Philippi (Matt. 16: 16, 17); according to the fourth gospel, Jesus and the disciples are aware of it from the first (John 1: 34, 41, 45, 49; cf. 2: 13-20). Finally may be mentioned the long and sustained discourses of Jesus given in the fourth gospel, which are not in the manner of Jesus according to the synoptists. These differences, striking even the cursory reader, received a more thoroughgoing treatment at the hands of Evanson (1792) in



Views in Johannesburg.

1. Chinese miners at Glen Deep. 2. National Bank of South Africa, Pritchard Street. 3. Commissioner Street. (Photos from *South Africa*.)
4. General view of the mining district. 5. Simmer and Jack Mine. 6. General Mining Buildings.

England and Bretschneider (1820) in Germany, who may be regarded as the fathers of the modern anti-traditional view of the gospel, according to which the work issued from a 2nd-century writer, and is more or less dominated by the forms of Greek thought. Thus the Tübingen school saw in it an artistic and idealized outline of the Saviour's life, given in the form of a dramatic elaboration of the conflict between light and darkness, impersonated respectively in the incarnate divine Logos (the Word) and the Jews; and as it seemed to presuppose the development of the church up to the middle of the 2nd century, the date of its composition was placed about 170 A.D. Hilgenfeld emphasized the presence of a Gnostic element, and Keim an Alexandrian influence, as corroborative evidence of non-apostolic origin. Schleiermacher, Neander, Bleek, Ewald, and others appeared on the traditional side, either simply accepting the Johannine authorship, or believing the work to be a more or less idealized reproduction of Johannine origin; and in consequence of their vigorous defence, the more radical criticism was compelled to abandon the later date for an earlier (120-140 A.D.). The theory that the fourth gospel issued from an Ephesian Christian of the name of John (John the Presbyter or another) has attracted minds like Holtzmann; but if the disciple whom Jesus loved be not the apostle John and also the author of the gospel (see ch. 21:20-24), then the work is a barefaced forgery—a theory hard to reconcile with the lofty religious and moral spirit of the book. While the majority of recent foreign critics controvert the authenticity, English writers in the main adopt the apologetic standpoint, though they do not deny a subjective colouring. The external evidence (allusions or citations in Justin Martyr, etc.) is hardly decisive on the problem; if it tends to discredit the more extreme theories, it cannot be said to substantiate the traditional. On the whole, the tradition which associates the work with the apostle John is so ancient and unanimous that its opponents must employ against it more effective artillery than they have yet set in operation, since most of their attacks are met by the long-standing belief that the book was written by the apostle in his extreme old age (95-100 A.D.). See commentaries by Godet (trans. 1887), Westcott (*Speaker's*), Milligan and Moulton (*Popular*), Reynolds (*Pulpit*), Dods (*Expos. Bible*), Holtzmann (*Hand-Kommentar*); also San-

day's *Gospels during the 2nd Century* (1876); Luthardt's *Johann. Ursprung des vierten Evang.* (trans. 1875); M. Arnold's *God and the Bible* (1875); Albrecht Thoma's *Genesis des vierten Evang.* (1882); P. Ewald's *Das Hauptproblem der Evangelienfrage* (1890); H. H. Wendt's *Gospel according to John* (trans. 1902); Drummond's *Character and Authorship of the Fourth Gospel* (1904); and Sanday's *The Criticism of the Fourth Gospel* (1905). Also Introductions to N.T., and Lives of Jesus generally.

John, St., of Nepomuk or Pomuk (c. 1330-93), patron saint of Bohemia, born at Pomuk (Pilsen), ultimately became canon of the chapter of Prague. The cause of his martyrdom is variously given. He is, however, popularly believed to have refused to betray the confessions of Sophia, wife of King Wenceslaus, which he had received in his ecclesiastical capacity. See Frind's *Der geschichtliche Johannes von Nepomuk* (1871), and Wratislaw's *Life, Legend, and Canonization of St. John Nepomucen* (1873).

John, the name of no fewer than twenty-three popes, some of whom, in their day, were either famous or infamous. **JOHN I.** (523-6) went to Constantinople at the command of Theodoric, to expostulate with Justin, emperor of the East, for having promulgated severe decrees against the Arians. Being unsuccessful, he was on his return to Ravenna imprisoned by Theodoric, and died while still in confinement.—**JOHN II.** (533-5) is the pontiff who, at the suggestion of the Emperor Justinian, first sanctioned the proposition, 'Unus de Trinitate passus est in carne.'—**JOHN VIII.** (872-82) was the Pope who crowned Charles the Bald, emperor of the Romans (875). After suffering imprisonment by the Saracens, John went to France for help. He at first acknowledged Photius, but afterwards condemned him as a schismatic.—**JOHN XII.** (956-64), whose original name was Octavian, was the first to initiate the practice of changing the pontiff's name. Otho the Great of Germany at first favoured him, but later (933) used his influence to obtain the Pope's deposition on the ground of licentiousness—a new pontiff, Leo VIII., being elected. But John in 964 forced his way into Rome and banished Leo.—**JOHN XXII.** (1316-34) was one of the popes who reigned at Avignon. Tradition affirms that he was the son of a cobbler, but that his education was undertaken by his uncle, the chancellor of Robert of Sicily. Clem-

ent v. bestowed on him the see of Aignon, and he was elected to the papal chair in 1316. He bent his whole energies to carrying out the policy of Gregory VII. and Innocent III. regarding the extension of the temporal power. In the dispute between Frederick of Austria and Louis of Bavaria for the imperial crown he championed the cause of the former. During the contest which ensued, the papal party was expelled from Rome, John was declared deposed, and his legate had to leave the city. But Louis was unable to enforce his claims, and on his return to Germany things reverted to their former position; the anti-pope, Nicholas V., set up in opposition to John, went back into retirement.—**JOHN XXIII.** (1410-15) so disgraced the name of John that it has never been chosen by any other pope since. He became cardinal of Bologna (1402), then Pope, and was suspected of poisoning his predecessor to obtain the dignity. His life was scandalous to the last degree. Owing to there being two anti-popes in existence, he was induced to summon the Council of Constance, on the understanding that all three pontiffs should resign their dignity. This was done; but in place of re-electing John XXIII., the council deposed him, and elected Martin V. in his room.

John (?1167-1216), king of England, probably born at Oxford, was the youngest son of Henry II., and ascended the throne in 1199. In 1189 he joined Philip of France in a coalition against his father. During Richard I.'s absence in the Holy Land he attempted to secure the crown; and when Richard was in captivity, he allied himself with Richard's enemy, Philip of France. In 1203 John put to death Arthur, the son of his brother Geoffrey; and the death of John's able mother, Eleanor of Aquitaine, in 1204 was the signal for the conquest of Normandy, Anjou, Maine, and Touraine by the French king. In 1205 a struggle began between the papacy and the English king over the election to the archbishopric of Canterbury. The Pope, Innocent III., put aside John's candidate, and consecrated Stephen Langton (1208). On the refusal of John to receive Langton, Innocent laid England under an interdict, and in 1212 excommunicated the English king. John then yielded, and agreed to hold his kingdom as a fief of the papacy. But the English barons and clergy now determined to resist John's tyranny, and the defeat of his forces at Bouvines, on July 27, 1214, by Philip, and his own failure to hold Poitou,

encouraged the English barons. On June 15, 1215, he was compelled to sign Magna Charta. False and treacherous, John had no intention of keeping to his promises, and civil war broke out. The reforming barons were aided by the French prince Louis, to whom they offered the English crown. In the struggle Hubert de Burgh successfully defended Dover for John, who, however, died suddenly at Newark. See Stubbs's *Constitutional History of England* (new ed. 1880), *The Early Plantagenets* (1876), and the Introductions to the Rolls Series (ed. by Hassall); other works by Miss Norgate, Sir James Ramsay, and J. R. Green.

John, the name of several kings of Portugal. **JOHN I.** (1367-1433), known as 'the Great,' founded the Aviz dynasty. His wife was sister of Henry IV. of England.—**JOHN II.** (1455-95) promoted the discoveries of Portugal in the East.—**JOHN III.** (1521-57) established the Inquisition in Portugal, and sent St. Francis Xavier to convert the East.—**JOHN IV.** (1603-56) founded the Braganza dynasty, and fought successfully with Spain for the independence of Portugal.—**JOHN V.** (1689-1750) took an unsuccessful part in the war of the Spanish Succession.—**JOHN VI.** (1769-1826) became regent in 1799. In 1807 he transferred his seat of government to Rio Janeiro. On his return in 1822 he accepted the new constitution.

John II. (1319-64), known as 'the Good'—i.e. 'the Generous'—became king of France in 1350. Being hard pressed by the king of Navarre and the English, and accused of maladministration of the finances, he surrendered the management of them to the States-general. Defeated at Poitiers (1356), he was taken prisoner to England, but returned after the treaty of Bretigny (1360). But the Duke of Anjou, whom he left as hostage, having fled, John thought it his duty to go back to England, where he finished his days.

John II., or **HANS** (1455-1513), king of Denmark, third son of Christian I., succeeded to the throne of Denmark (1481), and of Norway and Sweden (1483), though only generally recognized in the last mentioned. The collapse of his expedition against the Ditmarshers in the south of Schleswig (1500) led to rebellions both in Norway and in Sweden. The Norwegians were ultimately subdued (1508); but in Sweden, Sten Sture and Svante Sture, successive administrators, wrested the whole kingdom from the Danes, and, aided by the Hanseatic League, carried on the war till 1512, when a truce was made.

John III., **SOBIESKI** (1624-96), king of Poland, was born at Oleśko in Galicia. By his brilliant victories over the Swedes, Tartars, Turks (at Chotin in 1673), and Cossacks he gained for himself the throne of Poland (1674). Europe owes to him the relief of Vienna (1683), when it was besieged for the last time by the Turks. He was a man of considerable culture, fond of books and of scientific research.

John, **EUGÉNIE**. See **MARLITT**, **EUGÉNIE**.

John, **EVE OF ST.**, or **MIDSUMMER EVE**, is kept in honour of the nativity of John the Baptist. Many customs, in part of pagan origin, are connected with this occasion, especially the practice of lighting bonfires and of leaping over the flames. In Ireland, people watch all night; otherwise it is believed that the soul will leave the body and pay a visit to the place where the final separation will take place. In England it was thought that any one passing the night in the church porch would see the spirits of those who were destined to die during the ensuing year.

John, **WILLIAM GOSCOMBE** (1860), British sculptor, born at Cardiff. Winning a R.A. travelling studentship (1889), he worked in Rodin's studio at Paris, exhibited in the Royal Academy (1891), and was elected A.R.A. in 1897. His most important works are *The Statue of the Duke of Devonshire* (Eastbourne), which gained the gold medal at the Paris Exhibition of 1889; *The Boy at Play* (Tate Gallery, London); and statues at Cardiff and in Llandaff Cathedral.

John Dory. See **DORY**.

John of Austria, **DON** (1546-78), Spanish general, natural son of the Emperor Charles V., was born at Ratibon, and passed as the son of a Spanish nobleman named Quijada. Appointed when only twenty-two by Philip II. commander of the forces against the rebel Moors of Granada, he triumphantly subdued them. As generalissimo of the combined fleets of Spain and Italy he gained a great naval victory over the Turkish fleet in the Gulf of Lepanto (1571). After the refusal by Philip to allow him to accept the proffered sovereignty of Albania and Macedonia, he commanded an expedition against the Moors in Africa, and took Tunis and Biserta. In 1576 he became governor of the Netherlands, which were then in a state of rebellion. After taking Namur, Louvain, Nivelles, and other towns belonging to the insurgents, he died, it is said, from the effects of poison. See Sir W. Stirling-Maxwell's *Don John of Austria* (2 vols. 1883).

John of Bohemia (1296-1346), the blind king, was son of the Emperor Henry VII., and became king of Bohemia through his marriage with the heiress to the throne. There was a fierce contest between the houses of Austria and Bavaria for the Bohemian empire, and John achieved the victory for Bavaria in 1322 at Mühldorf. He became an ally of the French king in the war against England, and was slain at Crécy. See **BOHEMIA**.

John of Bologna, called the Fleming (1524-1608), sculptor, was born at Douay, and became sculptor at the court of the Medici. Among his masterpieces are a splendid and impressive fountain of Neptune at Bologna (whence his name), a Mercury in bronze, airy and full of grace, and *The Rape of a Sabine Woman*. His miniature works in bronze won him much fame.

John of Gaunt (1340-99), Duke of Lancaster, the fourth son of Edward III., was born at Ghent. In 1359 he married Blanche (d. 1369), the heiress of the duchy of Lancaster, and was himself created Duke of Lancaster in 1362. After the close of the Black Prince's expedition to help Pedro the Cruel of Castile, John married Constance, daughter of Pedro, and in 1372 assumed the title of King of Castile, but in 1387 resigned all claims in favour of his daughter Catherine. In England, where he exercised great influence, he supported Wycliffe, but failed to gain the confidence of the House of Commons. After 1389 his influence was used to promote peace between Richard II. and the nobles. In 1394 his wife Constance died, and in 1396 he married Catherine Swynford, by whom he had already three sons and one daughter, known as the Beauforts. These children were legitimized by Richard II., and in the following century figured prominently in English affairs. His eldest son, Henry Bolingbroke, Earl of Derby, became king as Henry IV.

John of Leyden, properly **JOHANN BEUCKELSZOON** or **BOCKHOLD** (1510-36), a notorious fanatic, was born at Leyden. Having joined the Anabaptists, he established himself in the city of Münster, where he set up a peculiar commonwealth in preparation for the new Zion which he prophesied as about to come. After committing gross excesses and cruelties for two years, he was captured by the bishop of the city, and with his followers was put to death. See **ANABAPTISTS**.

John of Salisbury (c. 1115-80), English author, taught for a time in Paris, apparently returning to England about 1147. He acted

as secretary successively to Archbishop Theobald and Thomas à Becket; accompanied the latter on his virtual exile in France, and witnessed his assassination (1170). In 1176 he became bishop of Chartres. In his *Polycraticus* (first printed 1476) he set forth his views on contemporary life, and in his *Metalogicus* deals with contemporary education and thought. He also left a *Life of St. Thomas à Becket* and a *Life of St. Anselm*. His *Works* were printed by J. A. Giles in 1848. See Schaarschmidt's *Johannes Sarisburiensis* (1862).

John o' Groat's House, Caithness-shire, Scotland, 13 m. N. of Duncansbay Head, and 18 m. N. of Wick.

Johns Hopkins University, Baltimore, Maryland, U.S.A., comprises (1) a collegiate school, (2) a graduate school, and (3) a medical school. The professors and teachers number 143, and the students 650. The university was incorporated in 1867, in May 1889 the hospital was opened, and in 1893 the inauguration of the medical school followed. See HOPKINS, JOHNS.

Johnson, ANDREW (1808-75), seventeenth president of the United States, was born at Raleigh, N. Carolina. In 1842 he was sent up to Congress. In 1853 he became governor of Tennessee, and in 1857 United States senator. Hitherto a Democrat, he warmly opposed the movement for the secession of the South, and thus drew nearer to the Republicans. After the assassination of Lincoln (1865) Johnson was made president. He at once opposed the Republican party, who wished to give the negro a vote. Congress passed bills, and Johnson applied his veto more often than all the presidents before him. When he tried to gain possession of the war department at Washington by dismissing Stanton, it was resolved to impeach him (1868); but his accusers failed to obtain the requisite two-thirds majority. He was a man of independent character, and absolutely honest, but was deficient in tact and intemperate in language. See *Life* by J. S. Jones (1902).

Johnson, FRANCIS (?1796-1876), English Oriental scholar, taught Sanskrit, Telugu, and Bengali in the college of the East India Company at Haileybury from 1824 to 1835. He compiled a *Persian Dictionary* (1829, reissued 1852), and published selections from the *Mahābhārata* (1842), as well as from the *Hito-padesa* (1840).

Johnson, SIR GEORGE (1818-96), English physician, born at Goudhurst in Kent, was appointed (1863) medical professor at King's College, London, and also physi-

cian to the hospital. Becoming consulting physician to that hospital (1886), in 1889 he was appointed physician extraordinary to Queen Victoria. He published *Diseases of the Kidney* (1852); *Lectures on Bright's Disease* (1873), to the study of which he made valuable contributions.

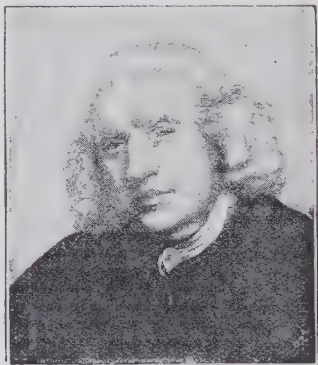
Johnson, LIONEL (1867-1902), English poet and critic, was born at Broadstairs. He came to London, and devoted himself to literature and journalism. His monograph on *The Art of Thomas Hardy* (1894) showed rare critical promise, and was followed by *Ireland: with Other Poems* (1897), and *Poems* (1899).

Johnson, RICHARD (1573-1659?), English author, is thought to have been a member of the household of Anne, wife of James I. He wrote the *Famous Historie of the Seaven Champions of Christendom*, including St. George of England (the oldest known copy is dated 1597); *Pleasant Conceits of Old Hobson* (1607), a collection of stories grouped round an imaginary personage; and poems, some published as the *Crowne Garland of Goulden Roses* (1612).

Johnson, RICHARD MENTOR (1780-1850), vice-president of the United States, was born at Bryant's Station, Kentucky. Sent to Congress as a Republican (1806), he served till 1818, and from 1819 to 1829 was a senator. On the outbreak of the war with Great Britain (1812) he hastened to Kentucky, and recruited a regiment of mounted riflemen, and the following year raised a second regiment, which he commanded in Harrison's Canadian campaign. He especially distinguished himself at the battle of the Thames (1813), where he was wounded. He became vice-president in 1837.

Johnson, SAMUEL (1709-84), the lexicographer, was born at Lichfield. He studied at Pembroke College, Oxford. After acting as usher (1732-3) at Market Bosworth in Leicestershire, he published (1735) a translation of Lobo's *Voyage to Abyssinia*. In the same year he married, and set up a school at Lichfield. In 1737 he went to London in company with David Garrick, and in the following year obtained regular employment on the *Gentleman's Magazine*. He edited its parliamentary reports from 1738 to 1741, and contributed them himself from July 1741 to March 1744; but he was never in the gallery of the house, and merely worked up notes which were supplied to him. In May 1738 he published his first poem, *London*, in imitation of the third satire of Juvenal. Its success won him the friendly interest of Pope. In 1742 he was employed on the catalogue of the Harleian Li-

brary. Two years later appeared his *Life of Savage*, afterwards included in the *Lives of the Poets*; it brought him at once into note. His reputation grew so steadily that in 1747 several London booksellers contracted with him for a *Dictionary of the English Language*. This did not appear till April 1755. Its definitions are often prejudiced, and its derivations are worthless; but it everywhere affords evidence of Johnson's vigorous and acute intellect, and is of great historical importance as a record of the language in the 18th century. Johnson's letter to the Earl of Chesterfield in connection with the dedication of the work dealt the death-blow to the system of literary patronage. Johnson, however, had not devoted the eight years entirely to the *Dictionary*. In 1749 he published the *Vanity of Human Wishes*, an imitation of the tenth



Samuel Johnson.

satire of Juvenal, and his best poem. In February of the same year Garrick staged *Irene*, a tragedy in blank verse, written mostly at Lichfield by 1737; but it was not a success. In March 1750 Johnson started the *Rambler*, a periodical on the model of the *Spectator*, and it appeared regularly every Tuesday and Saturday till March 1752. In 1753-4 he contributed to the *Adventurer*, and in 1756 he began to edit the *Literary Magazine*. In 1758 he started another periodical, the *Idler*, which appeared weekly from April 1758 to April 1760. In 1759 he wrote *Rasselas, Prince of Abyssinia*, in the evenings of a week. But in 1762 he was granted a pension of £300 by Lord Bute; and from this time dates his literary dictatorship, which was confirmed by the founding of the Literary Club in 1764. His edition of Shakespeare appeared in eight volumes in 1765. The text is sometimes faulty; but Johnson recognized the value of the first

folio (1623), and he has no superior in sagacious comment. On the whole, his was undoubtedly the best edition of Shakespeare which had yet appeared. In 1769 he was appointed professor in ancient literature to the Royal Academy. Then for some years his sole work was four Tory pamphlets, published together in 1776, under the title *Political Tracts*. In 1773 he was induced by Boswell, whom he had known since 1763, to set out on the memorable tour to the Hebrides. Both travellers have left records of their experiences—Johnson's *Journey to the Western Islands of Scotland* appearing in 1775. In 1774 he toured with the Thrales (whom he had met in 1765) in North Wales, and in 1775 he visited Paris with them. But Johnson was yet to write his greatest work, the *Lives of the Poets*. The first four volumes appeared in 1779, and the remaining six in 1781. Altogether there are fifty-two *Lives*, and of these only one—that of Young—is by another hand. With all its faults, the *Lives of the Poets* remains one of the greatest monuments of English criticism. The accounts of Dryden and Pope are masterpieces; but there is matter for question in his criticisms of those poets who, like Milton and Gray, did not conform to the classical manner of the 18th century. He was buried in Westminster Abbey. Great as Johnson is as a writer, there is much truth in Macaulay's remark, that 'Boswell's book had done for him more than the best of his own books could do. The memory of other authors is kept alive by their works; but the memory of Johnson keeps many of his works alive.' His prose style has been the subject of much unjust ridicule. It is massive rather than heavy; and the rapidity with which he wrote would alone prove that it was not laboured. His later work has often a 'colloquial ease.' *Works*—ed. Hawkins, with *Life*, 13 vols. (1787); ed. Murphy, with *Life*, 11 vols. (1796); ed. Walesby, 11 vols. (1825); *Letters*—ed. Birkbeck Hill, 2 vols. (1892); *Life* by Boswell (1791); ed. Birkbeck Hill, 6 vols. (1887, etc.); Mrs. Piozzi's *Anecdotes of Johnson* (1786); Leslie Stephen's *Johnson* (English Men of Letters, 1878); Birkbeck Hill's *Dr. Johnson, his Friends and his Critics* (1879); and Grant's *Johnson* (Great Writers), containing an excellent bibliography.

Johnston, ALBERT SIDNEY (1803-62), American Confederate general, born at Washington, Kentucky; saw service on the Texas frontier in 1836. In 1857 he restored order among the Mormons in Utah, and when the civil war broke out he joined the

South, and was given high command, but was killed when commanding at the battle of Shiloh against Grant (1862). See *Life* by his son, W. P. Johnston (1878).

Johnston, ALEXANDER KEITH (1804-71), Scottish geographer, was born at Kirkhill in Midlothian. Forming a partnership with his brother about 1826, he carried on work as an engraver, and issued a *National Atlas* (1843); followed by a *Physical Atlas* (1848), which comprised illustrations of the 'Geographical Distribution of Natural Phenomena,' and by a *Dictionary of Geography* (1850). Johnston was geographer royal for Scotland from 1843. His greatest work was his *Royal Atlas of Modern Geography* (new ed. 1904).

Johnston, ALEXANDER KEITH, the younger (1844-79), Scottish geographer, son of the foregoing, was born at Edinburgh, and became the head of the geographical department of W. and A. K. Johnston's London branch in 1869. He accompanied an expedition to survey the Paraguay (1873-5); and after that led the Royal Geographical Society's expedition to Lake Nyasa (1878), but died at Berobero, 120 m. from Dar-es-Salaam, of dysentery. He published *The Library Map of Africa* (1866); *The Book of Physical Geography* (1877); and *A Physical, Historical, Political, and Descriptive Geography* (4th ed. 1890).

Johnston, ARCHIBALD, LORD WARRISTON (?1610-63), Scottish statesman, born at Edinburgh. Having drafted the remonstrance to the ritual set up by Charles I., he became procurator of the church (1638). He was appointed one of the lords of Session (1641), and created king's advocate by Charles I. while the latter was in the hands of the Scottish army (1646). He drew up, in all likelihood, the 'Act of Classes' (1649), and in the same year became lord clerk register. Ultimately he allied himself with Cromwell, who made him (in 1657) a commissioner for the administration of justice in Scotland. After the restoration he was tried and executed. See *Johnston of Warriston* by W. Morrison, in *Famous Scots Series*.

Johnston, ARTHUR (1587-1641), Scottish physician and humanist, was born at Caskieben, Aberdeenshire. His fame as a writer of Latin verse rests upon his elegy on James I. (1625); his translation of the Psalms into Latin elegiac verse (1637); a version of the *Song of Solomon*, also in Latin verse (*Cantici Salomonis Paraphrasis Poetica*, 1633); and contributions to the *Deliciae Poetarum Scotorum hujus Aevi* (1637), for which he was largely responsible. He was elected rector of King's

College, Old Aberdeen (1637), and was for some time physician to Charles I. His *Opera* were published in 1642. His poems (with memoir), edited by Principal Geddes, were reprinted in two vols., under the title *Musa Latina Aberdonensis*, by the New Spalding Club (1892-5).

Johnston, SIR HARRY HAMILTON (1858), English administrator and explorer, was born at Kennington, London. He explored the Portuguese possessions of the river Congo (1882-3), and led the scientific expedition to Mt. Kilimanjaro at the request of the Royal Society (1884). In 1889 he made an expedition to Lakes Nyasa and Tanganyika, which led to the founding of the British Central Africa Protectorate, and to the addition of a vast territory to the British empire. He was administrator of the protectorate (1891-7), and in 1899-1901 was special commissioner and consul-general for the Uganda Protectorate. His chief works are: *River Congo* (4th ed. 1895); *Kilimanjaro* (1886); *Life of Livingstone* (1891); *British Central Africa* (1897); *The Uganda Protectorate* (1902); *The Nile Quest* (1903).

Johnston, JAMES FINLAY WEIR (1796-1855), Scottish chemist, born at Paisley; held a readership at Durham University; carried out his most valuable work in the chemistry of agriculture, which he embodied in his *Lectures on Agricultural Chemistry and Geology* (1844), *Catechism of Agricultural Chemistry and Geology* (1844), *Contributions to Scientific Agriculture* (1849), and *The Chemistry of Common Life* (1855).

Johnston, JOSEPH EGLESTON (1807-91), American Confederate general, born in Virginia, served brilliantly in the Mexican campaign (1846-7). On the civil war breaking out he joined the South. Along with Beauregard he defeated M'Dowell at Bull Run (1861). Defeated at Williamsburg by M'Clellan (1862), and again at Fair Oaks, next year he attempted the relief of Vicksburg, but unsuccessfully. Early in 1865 he was put in command of the Confederate troops in S. Carolina—a forlorn hope; and on August 26 surrendered with his army at Durham's Station. Notwithstanding constant illness, Johnston was one of the ablest Southern commanders. He published a *Narrative of Military Operations* (1874). See Hughes's *General Johnston* (1893).

Johnston, SIR WILLIAM (1802-88), Scottish geographer, was born at Kirkhill, Midlothian. He was joint founder with his brother Alexander Keith Johnston (the elder) of the firm of W. and A. K. Johnston, map publishers.

Johnstone, tn., Renfrewshire, Scotland, 3½ m. w. by s. of Paisley. Principal industries: cotton and flax spinning, and the manufacture of machinery, brass, iron, and shoe-laces. There are collieries. Pop. (1901) 10,502.

Johnstone of Annandale, a celebrated Border family, who waged constant warfare with the Douglasses and Maxwells. On the title of Earl of Annandale becoming extinct (1658), Charles II. bestowed the honour on one of the Johnstone-Annandale family, the Earl of Hartfell, who, in 1701, was further created Marquis of Annandale, a title which has lain dormant since 1792. Another ancient family disputed the right of the Annandale Johnstones to the chiefship—*viz.* the Johnstones of Hilton and Caskieben in Aberdeenshire.

Johnstown. (1.) City, Cambria co., Pennsylvania, U.S.A., 70 m. E.S.E. of Pittsburg, on the Conemaugh R. Its great industry is the smelting of iron and steel. The Cambria Steel Works alone employ some 10,000 men. Other manufactures are pottery, cement, bricks, beer, furniture, etc. Coal, iron ore, fire clay, and limestone are procured in the neighbourhood. In May 1889 a tremendous flood, caused by the breaking of a dam, destroyed most of the city and over 2,230 lives. Pop. (1900) 35,936. (2.) City, New York, U.S.A., co. seat of Fulton co., 40 m. N.W. of Albany. It manufactures gloves, underclothing, and gelatin. Pop. (1901) 10,130.

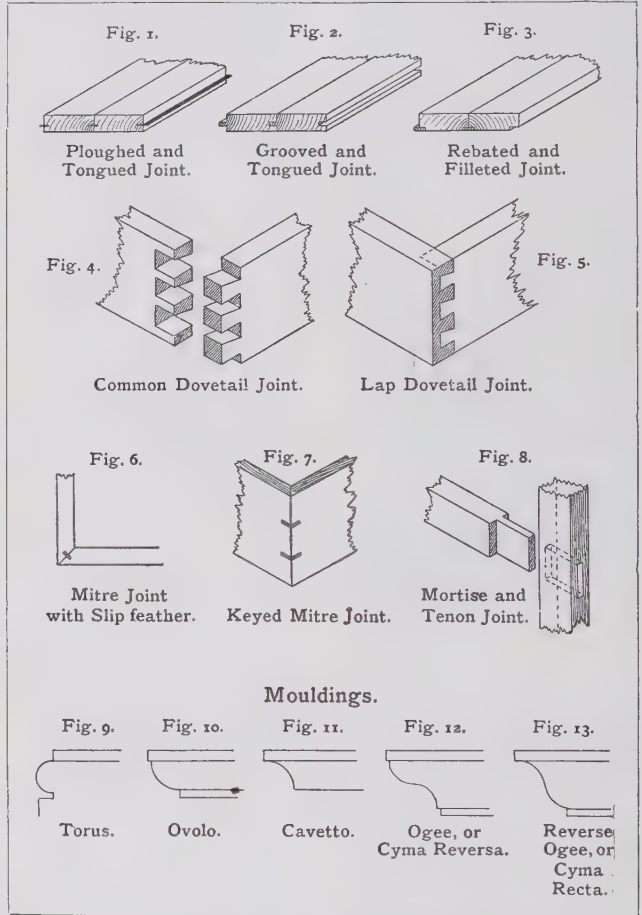
John the Baptist, the forerunner of Jesus Christ, was the son of Zacharias, a priest, and Elisabeth, a near relative of Mary, the mother of Jesus. He was born about the same time as Jesus, and was beheaded by Herod (Antipas) during our Lord's ministry. Little is told of the Baptist's early life, save that from his birth he was a Nazirite (Luke 1:15, *cf.* 7:33) and lived in the desert; but his 'shewing unto Israel' (Luke 1:80) was the beginning of a short ministry of amazing energy and power, the whole land being shaken by his demand of repentance, his proclamation of the kingdom of God, and his new rite of baptism. He baptized Jesus, but asserted, both on that occasion and later, his own inferiority and the preparatory character of his work. Our Lord's testimony to his greatness, his arraignment of Herod, and his consequent imprisonment and execution (Matt. 14), are known to all. See Lives of Christ generally; monographs by H. R. Reynolds (1874), Köhler (1881), J. Feather (1894) in *Bible Class Handbooks*.

Johor, or **JOHORE**. (1.) Malayan sultanate, in the extreme

s. of the Malay Peninsula, one of the British protected states known as the Negri Sembilan confederation. The surface of the country is low-lying, and on the coast swampy. Mt. Ophir, on the frontier of Malacca (3,840 ft.), is the greatest height. The chief products are gambier, coffee, pepper, and timber. Area, about 7,500 sq. m. Pop. estimated at about 300,000, of which the

tanneries, and produces fine wines. Pop. (1900) 6,254.

Joinery is the art of making and fitting the interior wood-work of a building, as opposed to carpentry, which concerns itself with the framework essential for the stability of the structure. Joiner's work includes doors, windows, wooden stairs and their accessory parts, as well as floorboards, architraves, skirtings, and



Joinery.—I. Joints and Mouldings.

Chinese are considerably over 200,000, and Malays about 50,000. (2.) Or **NEW JOHOR**, tn., cap. of above state, on the s. coast. The principal buildings are the palace of the sultan and the public offices. Johor is a free port, and has sawmills. Pop. (New Johor), about 20,000.

Joigny (anc. *Joviniacum*), tn., dep. Yonne, France, 15 m. N.W. of Auxerre, has distilleries and

linings. The various pieces are cut and shaped chiefly by machinery. The actual work of the joiner is thus often confined to fixing together the component parts, which must be done with great care and exactness. Among the subsidiary operations of joiner's work, the most important is the making of joints. These are of three main classes:—(1.) For joining together boards which lie

in the same plane, so as to cover a floor or other large surface. The tendency of such boards is to shrink and to separate. To remedy this, a narrow groove may be cut in the edge of each board, and an iron tongue inserted, forming a 'ploughed and tongued joint,' or the tongue may be replaced by a 'slip-feather' of hard wood cut across the grain, and similarly fitted into the grooves. In a 'grooved and tongued' joint the tongue is formed upon one board to fit the groove cut in the other. Boards in which the tongue and groove are cut with correspondingly shaped planes, and so make an exact fit, are termed 'match-boarding.' A 'rebate' joint is formed by cutting a rectangular slip out of the edge of each board. These may be laid so as to fit into each other, or may be connected by a fillet of wood (as in Fig. 3). In all these joints, or in any combination of them, the opening caused by a shrinkage of the wood will be covered by the tongue or fillet, thus preventing air and dust from penetrating between the boards. (2.) For connecting the ends of boards which meet at a right angle the ordinary dovetail joint is the most efficient. The edges of each board are cut into a series of alternate projections and indentations (as in Fig. 4), which fit into each other, and which by the bevel of their sides prevent the boards from drawing apart. In a 'lap dovetail' (see Fig. 5) the projections on one board do not extend though the whole thickness of the other, and thus leave one face in which the joint does not show. In 'mitre joints' the edges of the boards are cut to a bevel, so that the plane of the joint bisects the angle at which they meet. Unless strengthened by keys of hard wood (Fig. 7) or by a 'slip-feather' (Fig. 6), this joint depends entirely on the glue which binds it. An even simpler form is the 'glued and blocked joint,' in which the boards themselves are not cut, but are strengthened by a block glued into the angle. (3.) For forming framework, mortise-and-tenon joints are generally used, as in carpentry. In these the projecting piece, or tenon, on the end of one piece of wood fits tightly into the hole, or mortise, cut into the side of the other, and is glued in place.

Beadings are frequently added beside a longitudinal joint, partly for ornament, and partly to hide by their shadow any opening of the joint that may be caused by shrinkage of the wood. They are narrow and convex, in section usually part of a circle. When a beading is formed upon a board

from the substance of the wood itself, it is said to be 'stuck,' when a separate strip is fastened to the board, it is 'laid in,' or 'planted.'

Mouldings, on the other hand, are adopted entirely for the sake of ornament, usually for cornices and panels. Like beadings, they are said to be 'stuck' or 'planted,' according to whether they form part of the wood or not. They are usually shaped to segmental curves, convex and concave. The standard forms are shown in Figs. 9 to 13, with the names by which each is generally known.

Frames in joinery consist of narrow, flat pieces of wood, connected by mortise-and-tenon joints, and grooved on the inner edge to a depth of about $\frac{1}{4}$ in. to receive the boarding or panel which fills the opening. The vertical members of frames are termed 'styles,' the horizontal 'rails.' The panel is generally formed of two boards, united by a ploughed and slip-feathered joint, which is firmly glued, so that any shrinkage of the wood tends to draw the panel slightly away from the grooves in the framing only. Panels may be (1) square, (2) moulded, (3) flush, or (4) solid, according to whether they are (1) thinner than the frame and sunk square below it, (2) ornamented by moulding, (3) level with the surface of the frame, or (4) in one piece and flush with the frame on both sides. The edges of panels are usually further marked by beadings, grooves, or chamfers, to make the joint less conspicuous.

Doors, which should usually open inwards, range in size upwards from 6 ft. 6 in. by 2 ft. 9 in. for inside use, and from 6 ft. 6 in. by 3 ft. for entrances. If more than 3 ft. 6 in. wide, they should preferably be hung in two halves, or 'folding.' Doors may be 'ledged,' 'ledged and braced,' 'framed and braced,' or 'panelled.' Lledged doors, which are only suitable for inferior purposes, are made of narrow vertical boards, connected by three horizontal members termed 'ledges,' to the uppermost and lowest of which the hinges are fixed. Lledged and braced doors are further strengthened by diagonal braces between the ledges. Framed and braced doors consist of a frame strengthened by a middle horizontal piece, or 'rail,' and by diagonal braces, and filled up with narrow vertical boarding. Panelled doors, which are almost entirely used for dwelling-houses, have a framework of narrow pieces joined with mortises and tenons, and grooved to receive four or six panels in pairs. The uppermost pair in a six-panelled door are termed the 'frieze'

panels, those in a four-panelled door the 'top' panels; the other panels being respectively 'middle' or 'bottom,' according to their position, the horizontal frame members taking the names of 'top rail,' 'frieze rail,' 'middle' or 'lock rail,' and 'bottom rail.' The different varieties of panelled doors are also distinguished by technical terms denoting their thickness and the number and kind of panels they contain.

Windows should generally be about 2 ft. 6 in. from the floor inside, and should (for purposes of ventilation) reach nearly to the ceiling. They consist of two parts—the sash, which holds the glass; and the frame, which carries the sash. Sashes are usually either hinged at the sides to open like a door (as in a casement window), or are suspended by lines over pulleys, with counterweights which slide up and down as the sash is lowered or raised. The frames are in the first case solid, in the latter hollow to receive the counterweights. The sash consists of a framing of rails and styles, as in a door, and of sash bars, horizontal and vertical, which cut up the enclosed space and hold the glass. In a casement window the horizontal bars are continuous from side to side, the vertical bars being mortised into them. In a sliding sash window the vertical bars are continuous. The sash bars and the inside edges of the framing are rebated to receive the glass, which is secured in place with putty. The other sides of the bars, rails, and styles may be moulded, bevelled, or left square.

Wooden Stairs are supported on thick boards or pieces of timber placed at an inclination and termed 'strings.' These may be (1) 'cut,' when the stair boards rest on rectangular notches cut in the upper edge of the strings; (2) 'cut and mitred,' when the treads alone show above the strings, the risers being mitred into their vertical edges; or (3) 'housed,' in which case the upper edge of the string is left parallel to the lower, the stair boards being wedged into grooves cut in the inner sides of the strings. A usual practice is to house the ends of the stair boards in the string alongside the wall, and to rest the outer ends on a cut and mitred string. For steps over 4 ft. long a third intermediate string is necessary. Stair boards consist of risers and treads, the latter (which are laid flat) projecting over the (vertical) risers, and being finished with a round or moulded nosing. The treads should be of oak or other hard wood, and should have a thickness of $1\frac{1}{2}$ in. for a step of 4 ft. 6 in. in length. The risers

are jointed to the treads, both above and below, by grooved and tongued or rebated joints, well glued, the upper joint being further strengthened by small blocks glued into the inside angle. Balusters, vertical bars to support the handrail, should be dovetailed into the treads of the steps and secured to the handrail by a continuous flat bar

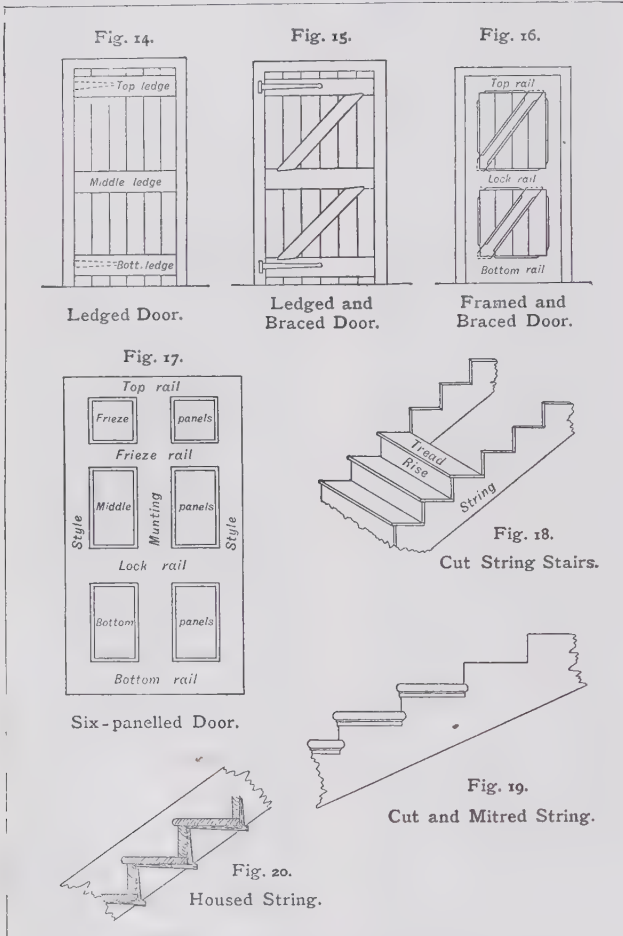
Skirtings are boards running round the base of the walls of a room, so as to hide the junction of the walls with the floor. They are usually from 6 to 12 in. wide, and may be either plain or ornamented with a moulding; being plugged to the wall direct, or fixed to rough battens termed 'grounds,' which are themselves nailed to plugs in the wall. The

fixed to the wall about 2 ft. apart. Of the linings to doorways, 'jamb' linings cover the sides, and 'soffit' linings the underside of the arch or lintel; of those to windows, the terms 'breast,' 'elbow,' and 'back' linings are given according to their respective positions. 'Wall linings' are employed generally to cover the surfaces of the walls beside windows—a development of this being those framed and panelled linings which conceal and at the same time form the walls in the rooms of many old houses. See works on *Carpentry and Joinery* by Fawkes, Gould, Tredgold, Sutcliffe, and others.

Joint Adventure, a partnership confined to a particular speculation or transaction. The term is one of Scots law, and since the Partnership Act, 1890, a joint adventure has been indistinguishable from a partnership.

Joint Fir, a name given to the members of the order Gnetaceæ, an order of small trees belonging to the division of Gymnospermæ. The name is given on account of the jointed character of the stems.

Joints, in morphology. Anatomically, a joint is formed by the approximation of two or more bones which are bound together and enveloped by other structures. A distinction must be drawn between rigid and mobile articulations. Good examples of the former are the sutures or *synarthroses* of the cranial bones, whose serrated edges interlock with only a thin sutural membrane between. When adjacent bones are separated by a plate of cartilage which is adherent to each, a limited amount of mobility results, and such a joint is known as a mixed articulation, or an *amphiarthrosis*. The joints between the vertebrae are of this type; and while the movement possible at each joint is but slight, the spine as a whole acquires a considerable degree of flexibility from a series of such articulations. Joints which are freely movable are called *diarthroses*. That part of each bone which enters into the formation of a diarthrosis is covered by a thin layer of cartilage, which acts as a smooth bearing surface over which the other moves with little friction. A joint of this nature is also provided with fibrous ligaments, which by binding the bones together limit the range of movement, and with a synovial capsule or sac, the inner surface of which secretes a glairy lubricating fluid known as the *synovia*. The outer layers of the synovial capsule are dense and fibrous, and the whole forms a bag enclosing the joint cavity into which the articular surfaces protrude. In the knee and max-



Joinery.—II. Doors and Stairs.

of wrought iron, which is screwed into both. The balusters should not be more than 5 in. apart.

Architraves are borders fixed round the openings of doorways and windows, both for ornament and to conceal the joint between the wooden frame and the plaster of the wall. They may be plain, moulded, or in the form of a pilaster, either extending down to the floor or resting on a plinth.

lower edge of the skirting may be housed or tongued into the floor, or simply rest upon it; in the latter case being 'scribed'—i.e. cut to fit the irregularities of the floor boards.

Linings are coverings of wood placed so as to hide or ornament parts of the interior of buildings. They should be made of narrow boards, jointed together longitudinally, and nailed to battens

illary joints are interarticular pads of cartilage, which, besides giving greater elasticity, allow of more complicated movements. Diarthroses may be hinge-shaped, or of the ball-and-socket form; or, again, the movement may be either gliding or rotatory. The ball-and-socket joint gives the widest range of movement, as in the shoulder, in which the ball-shaped head of the humerus is applied to the shallow glenoid fossa or socket of the scapula.

Of injuries, a dislocation is a separation of the articular surfaces. Like fractures, dislocations may be either simple or compound, the latter term being employed when, from laceration of the surrounding tissues, a communication is established between the joint cavity and the external air. In the hip an intracapsular fracture of the neck of the femur

prolonged, lest permanent stiffness result. To avoid this effect gentle movement and massage of the injured parts should be resorted to. A dislocation must be reduced as early as possible, and should it be compound, the greatest care must be taken to keep or to render it aseptic. The same necessity holds in the case of wounds of the joints. When, in spite of all precautions, septic infection, suppuration, and extensive destruction of the tissues ensue, the most the surgeon can hope for, in many cases, is ankylosis (union) of the bones in such a position as to secure a useful limb to the patient. Should the infection be so virulent as to endanger the patient's life, amputation may be necessary.

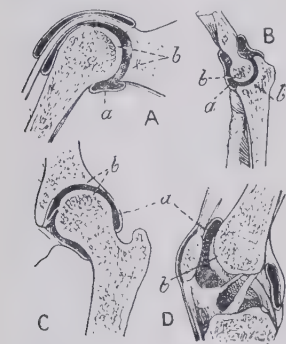
One of the commonest affections of an articulation is inflammation of the synovial membrane, or synovitis, which may be acute or chronic. In a large number of cases it is associated with some general pathological condition, such as rheumatism. In acute synovitis, from whatever cause it may arise, the membrane is congested, and exudes into the joint cavity an excess of synovial fluid of a more serous character than is normal. Pain and swelling are proportionate to the rapidity and extent of the effusion, which in bad cases may after a time become purulent. In such cases general arthritis, or inflammation of the whole joint, may follow, and may lead to the destruction of not only the membrane, but of ligaments, articular cartilages, and even the ends of the bones. In chronic synovitis the vascularity of the membrane is less marked, and there is generally a smaller amount of exudation, which, however, has a tendency to undergo fibrous development, so that the synovial membrane becomes thickened and indurated. Rheumatic synovitis corresponds very closely with that of an acute type. The process, however, is generally more extensive, the ligaments, cartilages, and surrounding tissues being involved. Suppuration rarely follows this form. Gouty synovitis is very similar to the rheumatic type, but the pain is more paroxysmal, and the general health is less disturbed. A chronic rheumatic arthritis sometimes gives rise to the condition known as hydrops articuli, in which the synovial membrane develops fringes and tufts of pedunculated growths of new tissue, while the cavity is often greatly distended by serous fluid. A grave form of synovitis occurs in diseases such as pyæmia, smallpox, scarlet fever, gonorrhea, typhoid, and dysentery. In such cases joint after joint is attacked in quick suc-

cession, and so extensive and rapid is the destruction that each may be wholly disorganized within a few days. Even in the slightest cases complete recovery is rare.

In young children inflammation of the epiphyses of long bones frequently extends to the neighbouring joints, and sets up a septic arthritis which does not materially differ from the forms above referred to. The result is frequently fatal; but if the joint cavity be freely opened and drained before destruction of the surfaces has set in, the joint may be saved. Another group of joint diseases includes those of tubercular origin and those which, arising from a traumatism, develop a tubercular or scrofulous character secondarily. The joints most frequently affected are those between the vertebrae and those of the lower limb. Hilton, in his classic work *Rest and Pain* (5th ed. 1892) insists on the importance of an injury such as a blow, or the long-continued pressure of over-fatigue, as a starting-point in these cases. In some, the bone is the first tissue to be affected; in others, the synovial membrane, the ligaments and cartilages becoming involved later; in many, the family history shows a phthisical taint; and in nearly all, the disease begins in childhood.

Tumours involving joints generally have their origin in the ends of the long bones. They are nearly always of a sarcomatous type, but may be wholly cartilaginous.

Joints, in geology, are fissures which traverse the rocks of the earth's crust, mostly in a vertical or nearly vertical direction. They are usually open, though their width may not exceed the thickness of a hair or of a fine knife blade, and where they are abundant they serve as passages for the circulation of underground water, and those which are nearest the surface may be widened by solution or filled with rotten debris. Joints are developed in perfection only in rocks which are hard and coherent; in sands, clays, and gravels they are absent or rare. In bedded sediments the joints are perpendicular to the bedding planes, and very frequently run in two directions, one set being nearly at right angles to the other. The master joints have usually a close relation to the dip of the strata, and as this is a consequence of the folding which has resulted from lateral earth pressure, it seems reasonable to believe that folding is an important factor in the production of joints. This is supported by the experiments of Daubrée. Where movement has taken place along a joint, it becomes a fault. Joints in some



Joints of the Arm and the Leg.

A, Shoulder joint; B, elbow joint; C, hip joint; D, knee joint (in section). a, Synovial capsules; b, interarticular cartilage.

may occur; and the knee is liable to displacement of the interarticular or semilunar cartilages—an accident which is often followed by permanent weakness of the joint. Nearly all injuries of joints are attended by considerable pain and swelling, due partly to extravasation of blood into the surrounding tissues, and partly to effusion of blood and synovial fluid into the joint cavity.

In nearly all cases of joint injury rest is an important factor of the treatment. Movement should be prevented by mechanical apparatus, and if there be much effusion and extravasation, elastic pressure should be applied by means of cotton wool and bandages. When great pain is present, however, or when the effusion is still increasing, the application of cold by ice bags or by Leiter's tubes gives relief, while in some cases hot fomentations are more grateful to the patient. The period for rest of an injured joint must not be too

cases have been injected with igneous material, forming 'dykes.' In the igneous rocks the jointing is very frequently columnar. Very perfect examples are furnished by the basaltic rocks of the Giant's Causeway and the west of Scotland. The columns are roughly hexagonal, and are bounded by three sets of vertical planes, making angles of sixty degrees with one another. There can be no doubt that these joints are due to contraction on cooling. Columnar jointing is sometimes produced in sandstones which have been greatly heated by contact with an intrusive igneous mass. Joints of this type are always perpendicular to the surfaces of cooling. A lava cools on its upper surface, and the joints, in consequence, are nearly vertical; a dyke cools on its vertical edges, and the joints are horizontal. But many kinds of granite and of gneiss are jointed in a manner closely resembling the sedimentary rocks. In the granites of Cornwall and some of those of Ireland, for instance, three sets of master joints are present, dividing the rock into cubical blocks. One of these is nearly horizontal, and for practical purposes is very similar to the bedding planes of sandstones.

Joint Stock Company. See COMPANY.

Joint Tenancy. If two or more persons are joint owners of the same estate, but on the death of one of them the estate passes to the survivor or survivors, such persons are said to be joint tenants. Joint tenancy is characterized by the four unities: all the tenants must acquire their estate under the same instrument, at the same time, with the same interest (i.e. one estate cannot be for life and the other freehold), and with the same possession (i.e. all the tenants are seised of the whole land). Joint tenancies can be severed by partition.

Joinville, tn., dep. Haute-Marne, France, on river Marne, 23 m. N. of Chaumont; has manufactures of chain cables, foundries, and blast furnaces. The chateau was built by the first Duke of Guise at the end of the 16th century, and was the birthplace of Jean de Joinville and Mary of Guise. Pop. (1901) 3,942.

Joinville, FRANÇOIS FERDINAND PHILIPPE LOUIS MARIE D'ORLÉANS, PRINCE DE (1818-1900), third son of King Louis Philippe. Trained for the navy, he distinguished himself (1838) at the bombardment of San Juan de Ulloa, and in 1845 bombarded Tangier. At the revolution of 1848 he took refuge in England. Returning to France (1870), he fought under

an assumed name, but was expelled by Gambetta. Later he was elected to the Assembly, in which he sat till 1876.

Joinville, JEAN, SIRE DE (1224-1317), French historian, was a seigneur of Champagne, who accompanied (St.) Louis IX. of France in his crusade of 1248-54. His *Histoire de St. Louis* was begun when Joinville was almost eighty; there is a critical edition by N. de Wailly (1874). Besides this he wrote a *Credo*, or confession of faith, in 1250.

Jókai, MÓR or MAURUS (1825-1904), novelist of Hungary, was born at Komorn. His first book, *Hétközpok* (1845), marked an era in Hungarian literature, and made the reputation of its author, who, as the editor of the literary journal *Elet Képek*, gathered around him the rising talent of the country. Having taken an active part in the Hungarian revolution (1848-9), Jókai was proscribed, and only owed his life to a stratagem of his wife, the tragic actress Rosa Laboryfalvy. During the next ten years he wrote no fewer than sixty romances, besides conducting three periodicals, including the government journal, *The Nation*. After 1863 Jókai entered Parliament, and became one of the principal supporters of Koloman Tisza (1875-1890). He has also written two hundred volumes of stories within the last five-and-thirty years. Jókai combines a humour hardly inferior to that of Dickens with an illimitable imagination and a gorgeous fancy. His defects are those of the ultra-romantic school. The most notable English translations of his novels are: *Timar's Two Worlds* (1888); *Midst the Wild Carpathians* (1894), with its sequel *The Slaves of the Padishah* (1903); *Pretty Michal* (1897); *Dr. Dumany's Wife* (1891); *Black Diamonds* (1896); *The Lion of Janina* (1897); *A Christian, but a Roman* (1900); *The Baron's Sons* (1902); and *Tales from Jókai* (1904), with a biography by R. N. Bain.

Jokjokarta. (1.) Residency of Java, with an area of 1,200 sq. m., and population (1896) 858,392. The province possesses indigo and sugar factories. See JAVA. (2.) Or DJOKJOKARTA, tn. in above prov., at the S.E. foot of Mount Merapi, 260 m. S.E. of Batavia, with 60,523 inhabitants (1896). Its principal feature is the citadel of the native prince, a vast walled enclosure, with some 15,000 inhabitants.

Joliba. See NIGER.

Joliet, city, Illinois, U.S.A., co. seat of Will co., on the Illinois R., 40 m. S.W. of Chicago. Joliet is the seat of the Illinois Steel Company, American Steel and Wire Company, and the

American Tin Plate Company. Pop. (1900) 29,353.

Jolly-boat, a small ship's boat, usually (at any rate in the merchant service) hoisted over the stern. In the navy it is from fifteen to twenty feet long, and is rowed with four oars.

Jomini, HENRI, BARON (1779-1869), general, and author of works on military tactics, was a native of Payerne (canton Vaud), Switzerland. In the French military service he rose to be chief of staff to Marshal Ney. After the Peninsular campaign (1808), and the retreat from Moscow, he joined the Russian service. To him was largely due the Turkish capitulation at Varna (1828). He published *Principes de la Stratégie* (1818), *Précis de l'Art de la Guerre* (1830), and histories of the revolution and Napoleonic wars. See *Life*, in French, by Lecomte (3rd ed. 1888), and by Sainte-Beuve (1869).

Jonah, the son of Amittai, a native of Gath-hepher in Zebulun, a Hebrew prophet who lived in the time of Jeroboam II., c. 780 B.C. (see 2 Kings 14: 25; it is supposed by some that the 'word' here referred to is found in Isa. 15-16: 12).

Jonah, THE BOOK OF, does not necessarily belong to the period of the prophet of that name, and makes no claim to have been written by Jonah himself. It recounts how the prophet was commanded by God to preach in Nineveh; how he fled instead to Tarsish; how on the voyage he was cast overboard, swallowed by a great fish, and liberated again after three days (ch. 1, 2); how eventually he preached to the Ninevites, was instrumental in bringing them to repentance (3), and was hugely displeased at the result (4). The tenor and style of the narrative seem to indicate that it was not written as a historical record, and its place among the 'Twelve Prophets' can be adequately explained only if we emphasize the prophetic bearing of the story. It may be interpreted as a parable: Jonah and his experiences are meant to represent Israel, false to her mission, overwhelmed by the nations, at length delivered, but still intolerant and sullen. Or we may regard it as the free adaptation of an ancient tradition, either connected with Jonah or not. In any case the booklet brings out very forcibly the truth that the bounty and mercy of God are infinitely greater than was conceived by the post-exilic popular religion, and that the heathen are susceptible of spiritual influences; and thus, with all its apparent simplicity and grotesqueness, it forms one of the profoundest productions of the period between the return and

the time of Christ, and, breaking through the narrow national limits of the old covenant, takes a long step towards the new. See volumes by Clay Trumbull (1892), Kennedy (1895), Perowne (*Cambridge Bible*), and books on the minor prophets—e.g. G. A. Smith, Orelli (trans.), Nowack (1897), and Dahm (1904).

Jonas, JUSTUS (1493–1555), German reformer, born at Nordhausen. He was an intimate friend of Luther, whom he accompanied to the Diet of Worms, and assisted in his translation of the Bible. He was rector of the University of Erfurt and professor of theology at Wittenberg. See *Justus Jonas* by Pressel (1863), and Meyer's *Festchrist des 400 Jährigen geburstags des Dr. Justus Jonas* (1893).

Jonathan. (1.) The eldest son of Saul. His prowess and ingenuity were shown in his successful attack on the Philistines at Michmash (1 Sam. 14), but it is the warmth and disinterestedness of his friendship with David which keep his memory fresh. Along with Saul he perished in battle with the Philistines at Gilboa. His young son Mephibosheth was tenderly cared for by David (1 Sam. 12–2 Sam. 1 *passim*). **(2.)** A renegade Levite of Bethlehem, the son of Gershom, who founded the idolatrous priesthood at Dan (Judg. 17 f.). **(3.)** The son of Mattathias, who after the death of Judas Maccabæus became the leader of the revolted Jews against the Syrian Bacchides, and subsequently high priest (161–143 B.C.). He was an able general and a clever diplomatist, but was eventually captured at Ptolemais, and shortly afterwards put to death. See MACCABEES.

Jonathan, BROTHER, personification of the citizen of the United States, corresponds to the English 'John Bull' and the French 'Jean Crapaud'. The name is said to come from Jonathan Trumbull (1710–85), governor of Connecticut. Nowadays 'Uncle Sam' has largely superseded 'Brother Jonathan' in popular use.

Joncières, FÉLIX LUDGER, known as VICTORIN DE (1839–1903), French musical composer, born in Paris. The two masters most influential on his style were Wagner and Gounod. He produced operas—*Sardanapale* (1867), *Dernier Jour de Pompéi* (1869), *Dimriti* (1876), *La Reine Berthe* (1878), *Lancelot* (1900); also the incidental music to *Hamlet* (1863–8), and other works. From 1871 till his death he was musical critic to *La Liberté*, under the pseudonym of 'Jennius.'

Jones, EBENEZER (1820–60), English poet, was born at Isling-

ton; became (1837) clerk in a city warehouse. His first volume of poetry—*Studies of Sensation and Event* (1843)—though attracting Browning and Rossetti, was eccentric in conception and harsh in expression. Towards the end of life he wrote three poems, which, though daring in conception, are as perfect in expression as his first were crude. For his works and accounts of him, see papers in the *Athenæum* by Theodore Watts-Dunton (1878); an edition of *Studies of Sensation* by Shepherd (1879), containing a Memoir by Sumner Jones and Reminiscences by W. J. Linton.

Jones, EDWARD BURNÉ. See BURNÉ-JONES.

Jones, ERNEST CHARLES (1819–69), English Chartist leader, born at Berlin. Called to the bar (1844), he identified himself with the Chartist movement (1846), and soon became one of its foremost orators. His advocacy of violence led to his imprisonment (1848–50). His poems, especially *The Battle Day* (1855), are of considerable merit, as are also his *Song of the Poorer Classes*, and other lyrics.

Jones, HENRY (1831–99), author of 'Cavendish's' *Laus and Principles of Whist*, was born in London. He practised as a physician in London from 1852 until 1869. A member of the 'Cavendish Club' in Cavendish Square, he published in 1862 *Principles of Whist Stated and Explained by Cavendish*. In 1863 it was reissued under the title before given, and became the standard authority upon the game. See Courtney's *English Whist and Whist Players* (1894).

Jones, HENRY ARTHUR (1851), English dramatist, was born at Grandborough, Bucks. He had been engaged for some years in commercial pursuits when he obtained his first hearing in London as a dramatist with *A Clerical Error* in 1879. His first definite success was made in melodrama with *The Silver King* (written with H. Herman) in 1882—the most important successors to which were *Saints and Sinners* (1884), a play which aroused a good deal of discussion at the time, and *The Middleman* (1889) and *Judah* (1890), both plays of a melodramatic kind, but marked by a considerable advance in technical skill. *The Dancing Girl* (1891), *The Crusaders* (1891), *The Bauble Shop* (1893), *The Masqueraders* (1894), *Michael and his Lost Angel* (1896), and *The Physician* (1897), were attempts at drama dealing more nearly with actual life and its problems. After a single and not particularly happy experiment at 'poetic' drama with *The Tempter* in 1893, Mr Jones produced a

series of successful comedies in *The Case of Rebellious Susan* (1894), *The Triumph of the Philistines* (1895), *The Rogue's Comedy* (1896), and *The Liars* (1897). *Carnac Sahib* (1899) and *The Luckey's Carnival* (1900) were followed by four 'serious' plays of modern life—*Mrs. Dane's Defence* (1900), *Chance the Idol* (1902), *Whitewashing Julia* (1903), and *Joseph Entangled* (1904). A number of Mr. Jones's plays have been printed, and he has also published a volume of essays and lectures under the title of *The Renaissance of the English Drama* (1895).

Jones, INIGO (c. 1573–1652), English architect, born in London. He was sent by William Herbert, third Earl of Pembroke, to study painting in Italy, where, however, he turned his attention to architecture. He is reported to have designed the palaces of Rosenborg and Frederiksborg in Denmark. On his return to England (1604), he designed the scenery for Ben Jonson's *Masque of Blackness*, given at Whitehall; but at a later date Jonson held Jones up to ridicule in *Bartholomew Fair*. After another visit to Italy (1613), Jones became surveyor-general of the royal buildings (1615). His chief work was the design for the banqueting hall at Whitehall (1619–22), now the Chapel Royal. See *Life* by Peter Cunningham (Shak. Soc., 1848).

Jones, JOHN PAUL (1747–92), Scottish naval adventurer, was born at Kirkbean, Kirkcudbrightshire. After many adventures, he obtained (1775) a commission in the American navy. Cruising round the British coasts (1777–8), he captured the *Drake* off Carrickfergus, and threatened Whitehaven. In 1779 he menaced Edinburgh, and captured the king's ship *Serapis*. In 1782 he joined the French navy, and later the Russian, being present at the battle of Liman (1788). On retiring from the Russian service he was appointed United States consul at Algiers, but died in Paris before his commission reached him. The record of his burialplace was lost, but in 1905, after a search extending over six years, his remains were discovered in the old St. Louis cemetery, Paris, and were conveyed in July 1905 to the United States by a squadron of the United States navy specially sent over to France for that purpose. See *Sherburne's Life of Paul Jones* (1825); *J. Taylor's Memoirs of Paul Jones* (1830); *Sands's Life of Paul Jones* (1830); and Fenimore Cooper's *Lives of Distinguished American Naval Officers* (1846).

Jones, OWEN (1741–1814), Welsh antiquary, known as 'Owain Myvyr,' born in Den-

bighshire, followed the trade of a furrier in London. He made a large collection of Welsh MSS. (now in the British Museum), and published a selection from them entitled *The Myvyrian Archæology of Wales* (1801-7; later 1870), which embodies poems ranging from the 5th to the close of the 13th century. To encourage the study of Welsh literature, he founded the Gwyneddigion Society in London in 1770.

Jones, OWEN (1809-74), English architect and decorator, son of the foregoing, born in London; took a leading part in the decoration of the buildings for the exhi-

He published a *Monograph of the Cretaceous Entomostraca* (1849), of the *Tertiary Entomostraca in England* (1856), and of the *Fossil Estheria* (1862).

Jones, SIR WILLIAM (1746-94), English Oriental scholar, born in London. Called to the bar in 1774, he became commissioner of bankrupts (1776). Appointed to a judgeship in Bengal (1783), he held the post until his death, and while discharging this duty made a careful study of Hindu law, the results of which were published in 1800 by Colebrooke as *Digest of Hindu Laws*. His translation of the *Institutes of Manu* ap-

advanced through a succession of preferments to the bishopric of St. Davids (1874). He was chaplain of the House of Lords (1878-82), and published *The History and Antiquities of St. Davids*, with E. A. Freeman (1852-7), *The Peace of God*, sermons (1869), and editions of classical writers.

Jongleurs, JUGGLERS, or JOCULATOIRES, a caste of wandering minstrels and mountebanks in mediæval Europe. Sismondi quotes the instructions given by a jongleur of Gascony to a young aspirant of his craft: 'He must know how to compose and rhyme well, and how to propose a *jeu*



*The Banqueting Hall, Whitehall, designed by Inigo Jones.
(The tablet beneath the centre window records the execution of Charles I. at that spot.)*

bition of 1851. He also executed designs for various public buildings, though it was in interior decoration that his best work was done. Among his publications are *Designs for Mosaic and Tessellated Pavements* (1842); *The Polychromatic Ornament of Italy* (1846); and *The Grammar of Ornament* (1856), his principal work.

Jones, THOMAS RUPERT (1819), English geologist, born in London. In 1858 he became lecturer on geology at the Royal Military College, Sandhurst, and was subsequently professor of that subject at the Royal Military and Staff Colleges, retiring in 1880.

peared in 1794. Among his other publications are *A Persian Grammar* (1772), and translation of the ancient Arabic poems called *Muallakat* (1783). But it was as the English pioneer in the study of Sanskrit that his influence was greatest. His collected works were published in 1799 by Lord Teignmouth. In 1784 he founded the Bengal Asiatic Society. See *Life* by Lord Teignmouth (1804 and 1835); also *Autobiography*, published by Jones's son (1846).

Jones, WILLIAM BASIL TICKELL (1822-97), English prelate, was born at Cheltenham, Gloucestershire. Appointed (1865) vicar of Bishopthorpe in Yorkshire, he

parti. He must be able to play on the tambourine and the cymbals; to throw and to catch little balls on the point of a knife; to imitate the song of birds; to play tricks with the baskets; to exhibit attacks of castles (? panorama, or dramatic representation), and leaps through four hoops; to play on the citole and the mandore; to handle the clavicord and the guitar; to string the wheel with seventeen chords; to play on the harp; and to adapt a gigue so as to enliven the psalter.' Sismondi further states that 'the jongleurs used to take their stations at the cross-roads, clothed in grotesque habits, and attract a crowd around

them by exhibiting dancing apes, legerdemain tricks, and the most ridiculous antics and grimaces. In this manner they prepared their audience for the verses which they recited.' This caste included both sexes. Lacroix informs us that the jongleurs had 'kings' of their own. Referring more distinctly to the mountebank caste, this writer also states: 'Many of them were Bohemians or Zingari. They travelled in companies, sometimes on foot, sometimes on horseback, and sometimes with some sort of conveyance containing the accessories of their craft and a travelling theatre.' Whether the gypsy element predominated is, however, unascertained. Dekker's picture of the English gypsies dressed as morris-dancers, and the account given of a gypsy troop in Paris in 1427, both represent a caste of jongleurs. See the 'Dissertation' by Ritson in his *Ancient English Metrical Romances* (1802), pp. cxlviii-cxxiv; Sismondi's *Historical View of the Literature of the South of Europe* (Roscoe's trans. 1846, 2nd ed.); Lacroix's *Manners, etc., of the Middle Ages* (1876); and Lucas's *Yetholm History of the Gypsies* (1882).

Jönköping, cap. of the co. of the same name, Sweden, charmingly situated on the s. side of Lake Wetter. It has a harbour, good shipping trade, and manufactures of matches, carpets, paper, wood pulp, tobacco, arms, and machinery. Here (1809) peace was concluded between Sweden and Denmark. Pop. (1900) 23,143.

Jonquil (*Narcissus jonquilla*) is a native of Spain, whence it was introduced to Britain in the 16th century. It bears very sweet-scented yellow flowers in early spring; the division of the limb is horizontal, and the corolla tube very long and slender. From two to six flowers are borne on a stem. There is a double variety.

Jonson, BEN (?1573-1637), English poet and dramatist, claimed descent from the Johnstons of Annandale. He was probably born in Westminster. He served in the English contingent in Flanders under Maurice of Nassau, and, if he spoke truth, slew a Spaniard in single fight. About 1592 he returned to London, and in 1597 he was a player, and was writing plays for Henslowe. During 1598 he killed a fellow-actor, Gabriel Spencer, in a duel, stood his trial for murder, pleaded benefit of clergy, was branded in the thumb, and, while in prison, became a Roman Catholic. In the autumn his *Every Man in his Humour* was acted at the Globe, possibly through the good offices of Shakespeare, and was followed

in 1599 by *Every Man out of his Humour*. The children of the Queen's Chapel produced his *Cynthia's Revels* (1600) and *Poetaster* (1601). The latter play was an episode in the 'war of the theatres,' not to be taken too seriously, in which Jonson on one side, and Shakespeare, Marston, and Dekker on the other, led the hosts. *Sejanus* appeared at the Globe in 1603. With the accession of James I. began the long series of Jonson's court masques, for which he provided the poetry and the learning, and Inigo Jones the architecture. In 1605 he joined Chapman and Marston in prison on account of the criticism of the Scots in their joint play of *Eastward Ho*. He was employed as a spy on the Roman Catholics at the time of the Gunpowder Plot. At this time he was the centre, with John Donne, of a brilliant circle of wits. He was on friendly terms with Shakespeare and with Bacon. He lorded it in the taverns, first at the Mermaid, somewhat later at the Dog, the Sun, and the Triple Tun, where the young poets courted him. At some uncertain date he received the appointment of poet laureate, and among his patrons were the Sidney family, the Earl of Pembroke, and Lucy, Countess of Bedford, for whom and others he wrote much miscellaneous verse. The regular stage was now in the background of his interests, but *Volpone*, *Epicene*, *The Alchemist*, *Catiline*, *Bartholomew Fayre*, *The Case is Altered*, and *The Devil is an Ass* were all produced between 1605 and 1615. In 1613 Jonson went to France as tutor to Sir Walter Raleigh's son. In 1618 he undertook his famous walk to Scotland, and visited William Drummond of Hawthornden. The summer of 1619 was spent with another poet, Richard Corbet, at Oxford. During the reign of Charles I. his vogue diminished. The court masques began to go to other men. He quarrelled with Inigo Jones. His later plays—*The Staple of News* (1625), *The New Inn* (1629), *The Magnetic Lady* (1632), *The Tale of a Tub* (1633)—show a falling away of power; and *The New Inn* was markedly unsuccessful. He withdrew from court about 1630, and in his later years was helped by the Earl of Newcastle. At his death, one of his best pieces, *The Sad Shepherd*, remained a fragment. He died at Westminster, and was buried in Poets' Corner. *Collected Works*, 1616, 1816 (ed. W. Gifford), 1875 (ed. Cunningham), 1894 (ed. B. Nicholson, plays only, and incomplete); *Monographs* by J. A. Symonds (1886) and A. C. Swinburne (1889).

Joplin, city, Jasper co., Missouri, U.S.A., centre of a lead and zinc region, 140 m. s. of Kansas City; has large smelting furnaces, machine shops, and foundries. Pop. (1900) 26,023.

Joppa. See JAFFA.

Jordaens, JACOB (1593-1678), Flemish painter, was a native of Antwerp; in 1615 he became a 'master' in the Guild of St. Luke. Second only to Rubens in the Antwerp school, and recognized as its leader after his death, he excelled especially in depicting humorous scenes from the life of the populace. He also treated Biblical and allegorical subjects. Examples of his work are to be seen at the Louvre (Paris) and at Vienna. See Buchanan's *Jordaens et son Œuvre* (1905).

Jordan, THE, the largest river in Palestine, perhaps the most famous, and certainly one of the most remarkable of all rivers. It is formed by the confluence of three streams (Hasbany, Leddan, and Banias) from Mount Hermon, and pursues a due southerly course along a valley which gradually deepens from about 140 ft. above sea-level to a depression of some 1,300 ft. where it issues into the Dead Sea. Its course is at first marshy, and after a run of some eight miles it widens out into Lake Huleh (? Waters of Merom, Josh. 11:5f.), shortly below which the valley dips below sea-level. About twelve miles farther on is the Sea of Galilee or Lake of Gennesaret, from which to the Dead Sea is a stretch of sixty-five miles, through a valley of remarkable fertility, now known as El-Ghor—i.e. 'the rift.' The average rate of descent is nine feet per mile. Its best-known tributaries are the Yarmuk or Hieromax and the Jabbok on the l. bk., and the Jalud and the Cherith on the r. bk. Well-known places in the valley are Bethabara, Bethshean, Pella, Succoth, Adam, Jericho, and Gilgal. Including the length of the Hasbany (40 miles), the total course of the Jordan is about 200 m. See G. A. Smith's *Hist. Geog. of Holy Land*, ch. xxii. and *passim* (new ed. 1897); Henderson's *Palestine*, in Clark's Handbook Series, p. 21 f.; and Libby's *The Jordan Valley* (1905).

Jordan, DAVID STARR (1851), American naturalist, born at Gainesville, New York State; was taught at Cornell (1870-72), Butler University (1875-9), University of Indiana, of which he was president (1885-91). He acted (from 1872) as United States commissioner for fishery investigations, and since 1891 has been president of Leland Stanford University, California. His chief publications are *Fishes of North and Middle America* (4

vols. 1896-9); *Science Sketches* (1887); and *The Food and Game Fishes of North America* (1902).

Jordan, MRS. DOROTHEA (1762-1816), Irish actress, born near Waterford. After playing in Dublin and Leeds, where she gained considerable popularity, she appeared (1785) at Drury Lane as Peggy in *The Country*

the London stage (1814). In 1790 she became the mistress of the Duke of Clarence (afterwards William IV.); this relationship lasted for twenty years. She died at St. Cloud, France, a neglected, heart-broken woman. See *Boaden's Life of Mrs. Jordan* (2 vols. 1831).

Jordan, SIR JOSEPH (1603-85),

actor, pamphleteer, and writer of verses, until in 1671 he was appointed poet to the corporation of London. His duties in this post were to invent 'pageants' and compose the necessary panegyrics. Among his works are a comedy, *Money is an Ass* (1663), which had some success; *Wit in a Wilderness of Promiscuous Poetrie* (c. 1664), and *Pictures of Passions, Fancies, and Affections* (1665), two volumes of verse of some merit.

Jørgensen, ADOLF DITLEV (1840-99), Danish historian, director of the Danish record office (1883), and in 1899 royal archivist. His works are remarkable for profound and patient research and charm of style. See *Bidrag til Nordens Historie i Middelalderen* (1871); *Den Nordiske Kirkes Grundlæggelse* (1874-78); *Sønderjyllands Indlemmelse i den Danske Krone 172* (1885); *Johannes Ewald* (1888); *Peter Schumacher-Griffenfeld* (1893-4).

Jørgensen, JENS JOHANNES (1866), Danish author, born at Svendborg, the leader of the Danish symbolists who waged war against realism in their journal, *Taaenel* (1893-5). His earlier works are remarkable for a curious combination of poetic naïveté and erotic realism, notably *Livets Tre* (1893) and *Hjemme* (1894). Since his conversion to Roman Catholicism in 1895, Jørgensen's works have been mostly of a religious and polemical nature, but are still distinguished by exquisite beauty of style. They include *Beuron* (1896) and *Livsløgn og Livssandhed* (1896).

Jornandes, or JORDANIS (fl. 550), historian of the Goths. A notary originally, he turned Christian and became a monk, some say bishop of Ravenna. He wrote *De Regnorum ac Temporum Successione*, a history of the world to 551 A.D.; and *De Origine Actibusque Getarum*, based on the lost history of Cassiodorus. He had no originality, but was merely a plodding compiler. There is a good edition by Mommsen in *Mon. Germ. Hist.*, vol. v. (1884). See Stahlberg's *Jornandes* (1884).

Jortin, JOHN (1698-1770), English theological and miscellaneous writer, born in London, of Huguenot parentage. He was appointed to the vicarage of Kensington (1762), and in 1764 became archdeacon of London. An early volume of Latin poems, *Lusus Poetici* (1722), is of some value. Among his other works are *Remarks on Ecclesiastical History* (5 vols. 1751-3); *Life of Erasmus* (1758-60); and *Tracts, Philological, Critical, and Miscellaneous* (1790). See *Memoirs* by Disney (1792).



Girl, and took the town by storm. Her reputation was made by her charming impersonations of those characters which were of the happy, romping, tomboy order. She played for thirty years in Drury Lane almost without a break. In 1811 she appeared at Covent Garden, and here (as Lady Teazle) she made her last appearance on

English seaman, fought in the Dutch wars, and in 1667 took command of a squadron of fire-ships in an attack upon the Dutch at the Nore. He again served as vice-admiral of the Blue at the battle of Solebay (1672).

Jordan, THOMAS (?1612-85), English poet, born in London; led a precarious existence as

Josaphat. See BARLAAM.
Josefstadt, fortified tn. in N.E. Bohemia, Austria, 66 m. E.N.E. of Prague. It has manufactures of needles and cotton cloths. Pop. (1900) 6,116.

Joseph. (1.) Joseph, the eleventh son of Jacob, and the elder by Rachel, was the favourite of his father. His older brothers, out of jealousy, sold him to a company of merchants (Ishmaelites or Midianites, Gen. 37; cf. v. 25 with v. 28), who carried him to Egypt, and disposed of him as a slave to Potiphar, the captain of the guard. His trustworthiness soon secured him a place of honour in the household; but being falsely accused by Potiphar's wife, he was thrown into prison. His skill in interpreting the king's dream brought about his release, and he rose in a short while to the position of Pharaoh's chief minister. By his foresight he was able to preserve the country through seven years' failure of crops, and was the means of bringing his father and brethren to Egypt, the region of Goshen being assigned to them. His bones were carried out of Egypt at the exodus, four hundred years after his death, and buried in Shechem. See Gen. 37-50, *passim*. (2.) Joseph, the husband of Mary the mother of Jesus, and a descendant of King David, was a carpenter resident in Nazareth. Prominent in the narratives of the early years of Jesus—e.g. the birth stories and the episode in the temple when Jesus was twelve years old—he drops out of the later New Testament record. (See the apocryphal *Book of James, and Death of Joseph*). In the Roman Catholic Church his festival, on March 19, has increased in elaborateness, and in 1871 Pius IX. made him patron of the church. See E. H. Thompson's *The Life and Glories of St. Joseph* (1888). (3.) Joseph of Arimathea, a wealthy and righteous Jew, who begged from Pilate the body of Jesus and buried it in his own grounds. Arimathea has been doubtfully located about ten miles north of Jerusalem (the modern Er-Ram). Joseph, though a member of the Sanhedrin, was secretly a disciple of Jesus, and the ultimate act of courage by which he wiped out the reproach of his former timidity seems to have inspired Nicodemus to take a similar stand. The apocryphal *Gospel of Nicodemus* furnishes many embellishments. A mediæval English legend makes Joseph bring the Holy Grail (see GRAIL) to Glastonbury. See Wülcher's 'Excursus' to *Gospel of Nicodemus* (1872).

Joseph I. (1678-1711), emperor of Germany, of the house of

Hapsburg, and son of Leopold I., born at Vienna; was proclaimed king of Hungary (1687), and king of the Romans (1690), succeeding his father as German emperor (1705). He carried on a successful war, with the assistance of England, Holland, and Savoy, against Louis XIV., the allied armies being under the command of the Duke of Marlborough and Prince Eugene.

Joseph II. (1741-90), emperor of Germany, son of Francis of Lorraine and Maria Theresa, born in Vienna, was elected king of the Romans (1764), succeeding his father as German emperor (1765). Along with the sovereigns of Russia and Prussia, he signed the treaty by which Poland was divided among them (1772). On the death of his mother (1780) he came into possession of the Austrian throne. He helped in the



The Empress Joséphine.

suppression of the Jesuits; established religious toleration in his dominions (1781); was visited by Pius VI., who dreaded his reforms in convents; warred with Turkey in conjunction with Catherine of Russia; his zeal in correcting the abuses of the Roman Catholic Church caused an insurrection in Belgium; and the same thing happened in Hungary over his attempt to establish German as the universal language in his dominions. Among his other reforms were the abolition of serfdom, curtailment of feudal privileges, the readjustment of taxation, the framing of a new law code, and so forth. See Brunner's *Joseph II.* (2nd ed. 1885), and Nossinich and Wiener's *Kaiser Joseph II.* (1885).

Joseph, KING OF NAPLES. See BONAPARTES, THE.

Joséphine, MARIE ROSE (1763-1814), wife of Napoleon I., and

empress of France, was born at Martinique, her maiden name being Tascher de la Pagerie. She first married Vicomte Alexandre Beauharnais (1779), who was guillotined during the reign of terror, then Bonaparte (1796). She exercised a profound influence over the emperor. Her union with Napoleon proving without issue, was dissolved in 1809, to enable him to marry Marie Louise of Austria. Joséphine died at Malmaison. See Aubenas's *Histoire de l'Impératrice Joséphine* (1859); Marie le Normand's *The Historical and Secret Memoirs of the Empress Joséphine* (Eng. trans. 1895).

Joseph of Exeter, in Lat. JOSEPHUS ISCANUS (fl. 1190), mediæval Latin poet, was a friend of Baldwin, archbishop of Canterbury, whom he accompanied to Palestine (1188). His chief work was *De Bello Trojano*. See Jusserand's *De Josepho Exoniensi* (1877).

Josephus, FLAVIUS (37-c. 100 A.D.), Jewish historian, was a man of high birth, and was sent on a mission to Rome in 63 A.D. When the Roman governor left Jerusalem, he accepted the management of affairs in Galilee, and defended Jotapata for forty-seven days against Vespasian. Titus interceded for him, and his life was spared; but he was not released from custody until Vespasian was declared emperor in 70 A.D. Thenceforward he attached himself to the imperial family, taking the name Flavius out of respect to them, and living in Rome to the end of his life. His chief works (both written in Greek) are *The History of the Jewish War*, which gives a brief sketch of Jewish affairs from 170 B.C. to his own day, and a full account of the conquest of Jerusalem; and *The Jewish Antiquities*, narrating the history of the Jews from the creation to 66 A.D.—the latter part treats more fully what is outlined in the other work. Josephus possesses a clear and pure style, and his descriptions are vivid. His attitude to Christianity has been much discussed. In one passage, which by many critics is considered spurious, he speaks of Jesus as the 'true Christ,' and as 'more than man;' but it seems clear he was not a Christian. More probably he was a Pharisee, in whom Greek learning and philosophy had inspired a certain indifference to dogma, and a general toleration of all creeds. The best editions are those of Niese (1887-95) and Naber (1888-96). Eng. trans. by Shilleto (1889). See Drüner's *Untersuchungen über Josephus* (1897).

Josephus Iscanus. See JOSEPH OF EXETER.

Joshua ('Jesus,' Acts 7:45), the son of Nun, succeeded Moses as the leader of the Israelites, and completed the invasion of Canaan. After crossing the Jordan from the east he reduced Jericho and (after a reverse) Ai, defeated a large number of native kings, and occupied their territory, afterwards subdividing the land among the tribes of Israel. Joshua died at Mt. Ephraim at the age of one hundred and ten. (See next article.)

JOSHUA, THE BOOK OF, describing the Israelite conquest of Canaan, is now regarded as the necessary supplement to the Pentateuch, and in critical works the six books are conjoined under the name Hexateuch. The book was traditionally believed to have been written by Joshua himself, though Calvin abandoned the view. As a matter of fact, the same phenomena of composition as are noticed in Genesis reappear in Joshua, and the same writers (or schools)—viz. J, E, D, P, to whom the various strata of the Pentateuch are attributed—are found here. The whole has been edited under Deuteronomical influence at a relatively late date. Questions have been raised as to the reliability of the narrative, and as to whether Joshua himself is a person or personification. See O.T. introductions, and especially volumes on the Hexateuch, as Wellhausen (1889), Holzinger (1893), Briggs's *Higher Criticism of Hexateuch* (1897), Addis's *Documents of the Hexateuch* (1892); commentaries by Keil (1847), Knobel (1861), Dillmann (1886), Holzinger (1901).

JOSIAH, king of Judah (c. 639–608 B.C.), the son and successor of Amon, ascended the throne at the age of eight. The Scythian invasion in 630 was interpreted as a divine judgment upon the idolatry of the nation, and shortly thereafter Josiah, assuming the regal authority, began his campaign of reform. While the temple was being renovated by public subscriptions, the book of the law (Deuteronomy) was discovered by the high priest Hilkiah, and this gave a startling impetus to the progress of the reforming movement. Idolatry was suppressed by drastic measures, the local sanctuaries were abolished, and the worship was centralized at Jerusalem. A period of peace and prosperity followed, and was first broken by the rashness of the king himself, who attacked Pharaoh-nechoh (while on a campaign against Assyria) at Megiddo, and was defeated and slain. (See 2 Kings 22, 23 and histories of Israel.)

JOSIKA, BARON MIKLÓS (1796–1865), Hungarian novelist, was born at Torda in Transylvania,

and wrote a series of romances, historical and social, based on the model set by Sir Walter Scott. They are serious in intention, though enlivened with occasional touches of humour, and aim at a high moral standard. They achieved great popularity. Chief amongst them are *Abafi* (1836), *The Bohemians in Hungary*, *The Last of the Báthoris* (1847). His complete works run to nearly a hundred volumes.

JOSQUIN, DEFRÉS (1440–1521), Flemish musical composer, born at Vermaud, St. Quentin. At the invitation of Pope Sixtus IV. he went to Rome, where he remained until the Pope's death (1484). He gave a great impetus to music in Italy. Subsequently he became leading singer in the chapel of Louis XII. of France. A selection of his works was published by Commer (1877).

JOST, ISAAK MARKUS (1793–1860), Jewish historian, born at Bernburg in Anhalt, and taught in the Jewish school at Frankfurt. He is chiefly remembered for his *Geschichte der Israeliten* (1820–29), which he continued in *Neuere Geschichte der Israeliten von 1815–45* (1846–7). He also published *Allgemeine Geschichte des israelitischen Volkes* (1831–2); and edited the *Israelitischen Annalen* (1839–41). See Zirndorf's *Isaak Markus Jost* (1886).

JOSTEDALSBRÅ. See NORWAY.

JOTUN, a legendary being of N. European folklore. In the translations of the Scandinavian *Eddas*, where the jotuns figure prominently, their name is usually rendered by 'giant.' According to one view, they are purely mythical creations—nature-gods. Others, again, regard them as a real race, their original characteristics being magnified and distorted by popular fancy. One passage (*Saem.*, 55a) describes the jotun as a pithecoïd creature.

JOTUNFJELDE. See NORWAY.

JOUBERT, JOSEPH (1754–1824), French moralist and critic, a native of Montignac (Périgord), became a member of the brilliant literary circles of Paris just before the revolution. After his death Chateaubriand edited a selection of his *Pensées*, and a fuller edition was published in 1842 by Paul de Raynal. This was followed by the improved editions of Arnaud Joubert (1850) and Louis de Raynal (1862).

JOUBERT, PETRUS JACOBUS (1834–1900), Boer commandant, was born at Cango in Cape Colony; migrated when young to Natal, later to the Transvaal. He represented Wakkerstroom in the Volksraad from 1863 to 1875, when he was elected chairman of the Assembly. He was for a time attorney-general of the republic (1874). He

worked with Kruger against the annexation of the Transvaal by Sir T. Shepstone in 1877. When the flag of independence was raised in December 1880, he was appointed one of the triumvirate to whom the government of the country was entrusted. As commandant-general of the Boer forces he defeated the British at Majuba Hill on Feb. 28, 1881. Joubert twice unsuccessfully sought the presidency in opposition to Kruger—in 1893 and in 1898. On the outbreak of the Boer war (1899–1902) Joubert was again commandant-general, and invested Ladysmith; but ill-health compelled him to return to Pretoria, where he died.

JOUFFROY, THÉODORE-SIMON (1796–1842), French philosopher, born at Pontets (Jura); became (1833) professor of Greek and Roman philosophy at the Collège de France. His varied studies were gradually concentrated upon the philosophy of the Scottish school, and in 1836 he published a translation of Reid's works, with a biographical account of the Scottish philosopher. He also published *Mélanges Philosophiques* (1833; new ed. 1883), *Cours de Droit Naturel* (1833–42), and *Cours d'Esthétique* (1843). See *Life* in French by Tissot (1876).

JOUFFROY D'ABBANS, CLAUDE FRANÇOIS, MARQUIS DE (1751–1832), French inventor, was born at Roche-sur-Rognon, dep. Haute-Marne. In 1776 he launched upon the Doubs a boat the motive power of which was supplied by steam, and in 1783 produced a vessel propelled by paddles, but was unable to float his invention before Fulton produced his steam-boat in 1803. See monograph by A. C. J. Prost (1889).

JOUGS, jointed collars of iron, by which misdeameanants were held captive. The culprit's neck being encircled by the jougs, the two free ends of the iron band were slipped over each other and secured by a padlock. On the opposite side was a movable iron ring fastened into the collar by a small fixed ring, and by this ring the jougs were attached to a stone projecting from a conspicuous part of the churchyard wall.

JOULE is the practical electric unit of work; it equals 10^7 c.g.s. electro-magnetic units of work, or ergs, and represents the work done or heat generated by a watt per second, or an ampère flowing through an ohm in a second, or a coulomb passing through the P.D. of one volt. Taking Joule's equivalent (see THERMODYNAMICS) as $41'6 \times 10^6$ in the c.g.s. system, then the Joule being 10^7 ergs is the amount of heat required to raise 24 grammes water 1° C. See ELECTRICITY, CURRENT.

Joule, JAMES PRESCOTT (1818-89), English physicist, was born at Salford, and became a pupil of Dalton. His first work was on magnetism, particularly as to the magnetizability of iron by electric currents—a research which led to a definition of a practical unit of current, and to his discovery that the quantity of heat set free by the passage of a current through a conductor is proportional to the square of the current. These investigations in their turn paved the way for Joule's great discovery in 1843 of the mechanical equivalent of heat, careful determinations of which, by various methods, occupied his attention during the greater part of the rest of his life. Joule was awarded the Royal (1852) and Copley (1860) medals of the Royal Society. His *Scientific Papers* were collected and published (1885-7).

Jourdan, JEAN BAPTISTE, COMTE (1762-1833), French military commander, born at Limoges. After service in America, he was placed at the head of the army of the north, and inflicted upon the Austrians a signal defeat at Wattignies (1793). In another command he drove them across the Rhine (1794), and besieged Kastel and Mainz (1795). Crossing the Rhine again in 1796, he was defeated at Amberg and Würzburg. Once more in the field in 1799, he suffered further defeats, owing to his army being immensely outnumbered by that of Austria. He defended himself in the *Précis des Opérations de l'Armée du Danube sous les Ordres du Général Jourdan* (1799). Napoleon entrusted him with the direction of affairs in Piedmont (1800). He was created a marshal in 1804, and in 1806 was appointed governor of Naples.

Journal, or NECK, the cylindrical supporting parts of a horizontal revolving shaft, frequently made of length about one and a half diameters. In lines of shafting it is often made of length about four diameters. To minimize frictional losses, the journal is made as narrow as is consistent with strength. The journal box is a fixture on which a journal rests and revolves, instead of a pedestal bearing or plummer block.

Journal des Débats, LE, a French journal of moderate republican opinions, was founded in 1789 to report the proceedings of the National Convention. It was acquired in 1800 by Louis François Bertin, and conducted by him till his death, in 1841, when the direction passed to his sons, Amiard and Edouard Bertin. The *Débats* is one of the most authoritative of the French newspapers.

Journal de St. Pétersbourg, LE, is the official organ of the

Russian foreign minister. It is a daily paper, and is printed in the French language. It was founded in 1825.

Journalism. In the charter of the Institute of Journalists a journalist is described as one who is, 'professionally, habitually, and as his sole or chief occupation, engaged (1) as editor of a journal; (2) upon the staff of a journal in the capacity of a writer of leading, special, and other articles, correspondent, artist, literary manager, assistant-editor, sub-editor, or reporter; and (3) in supplying journals with articles, illustrations, correspondence, or reports.' The literary staff of a daily newspaper may be taken to consist of the editor, the leader-writer, the sub-editor, the reporter, and the special correspondent. The editor is the most important personality on the literary side of a newspaper. The position is one of enormous power and influence, and it is doubtful whether those who hold it would exchange it for a place either on the Treasury or on the episcopal bench. The office has always commanded the services of scholars, writers, and thinkers, such as Defoe, Bolingbroke, Swift, Henry Fielding, Smollett, Wilkes, Coleridge, Edward Sterling, Dickens, Thackeray, John Forster, Delane, Chenery, W. H. Mudford, Henry Dunckley (*Manchester Examiner*), Alexander Russel (*Scotsman*), John Morley, E. T. Cook, Mr. Buckle, Mr. Curtis, Sir W. C. Leng, Mr. W. L. Courtney, Sir Edwin Arnold, Mr. C. P. Scott, Sir E. Russell, Mr. C. A. Cooper, and Mr. C. Russell (*Glasgow Herald*). The editorship of a high-class daily paper is one of the principal prizes of the profession. The salary ranges from £800 to something approaching £3,000 a year, but the duties and responsibilities are exacting and onerous. Mr. Delane, perhaps the most famous of modern editors, never left the *Times* office till the paper had gone to press and the first complete printed sheet had been placed in his hands. 'Nothing was there which had not had his sanction. Literature, art, music, commercial news, trade reports, military and naval intelligence, the money article, the long series of letters from abroad, law reports—nay, the very police reports and local items—passed, however rapidly, under that all-scrutinizing eye and cool judgment.' An editor may, and often does, pass on much of this laborious work to his assistants; but if anything finds its way into the paper which had been better kept out, the responsibility is his, and his alone. The editor of a great London daily seldom,

if ever, writes a leading article in his own paper. The practice is different in the provinces, where, even in the case of the most important journals, the editor is usually responsible for the first or chief leader. But the occupant of such an editorial chair as that of the *Times* is too busy in other directions to engage himself in original writing. He has to choose and keep together a staff of able, practised, and expert writers, and to settle the line that shall be taken upon all the questions of the moment. Mr. Delane used to say that the great thing was to know what to keep out of the paper. The decision on such a matter has to be taken—sometimes in consultation with the editor, but more often on his own responsibility—by the sub-editor. All the news, or 'copy' as it is technically called, whether it comes by telegraph, train, post, or messenger, has to be sorted, arranged, and prepared for presentation in the paper by the sub-editor and his staff. The preparation involves the reading, the revision, and the punctuation of every line it is intended to publish. Nothing must be taken for granted. In the *Times*, and in the London papers generally, the telegraphic or written reports of meetings and of other events both in London and the provinces, the naval and military intelligence, the court and ecclesiastical news, are dealt with in one room. The telegrams and correspondence from the colonies and the Continent come within the province of the foreign sub-editor and his assistants. Among the qualities demanded from the reporter are strict accuracy and impartiality. The ability to take a verbatim shorthand note and to read it after it is taken—the two things are not by any means synonymous—will always remain one of the indispensable qualifications of the reporter. A reporter who seeks admission to the press gallery of the Houses of Parliament must be able to write anything from one hundred and fifty to two hundred words a minute. It is no uncommon thing for Mr. Chamberlain to speak a column of the *Times* in fifteen minutes. But the reporter must be just as competent to write a paragraph as to take and transcribe a verbatim note of a long speech. He must also be able to write a summary of a speech, or it may be of a whole meeting, which shall convey the substance of what has been said or of what has taken place. With the advent of what was called the 'new journalism,' interviewing was added to the varied functions a member of the reporting staff might be called

upon to discharge. The 'interview' is essentially a product of American journalism, of which it is, perhaps, one of the most distinguishing and characteristic features. Its adoption in England was slow and tentative. The journalist at first regarded the innovation with almost as much disfavour as the subject of the interview, but in the interval of nearly a quarter of a century which has elapsed since the introduction of this peculiar feature of American newspaper work into English journalism the objections to it have largely disappeared. The manner, however, in which the task is performed differs fundamentally in the two countries. In America the journalist's chief aim is to produce an 'entertaining' article, and almost everything is sacrificed to picturesqueness; while the English journalist attaches the first and last importance to accuracy, and to the faithful presentation of the views and sentiments expressed. One or two schools exist for the training of journalists, and a scheme for the practical examination of those desirous of entering the profession has been instituted by the Institute of Journalists. The institute, which has a membership of over 3,000 working journalists, was incorporated by royal charter in March 1890. The first and perhaps the most famous of war correspondents, Mr. William Howard Russell, was, at the moment of his appointment as representative of the *Times* in the Crimea, a reporter in the House of Commons. And many of the correspondents who took the field with the imperial forces during the Boer war (1899-1902) were writers who had had an intimate acquaintance with the reporters' room. The duties of the war correspondent are more dangerous, exacting, and responsible than those of any other worker in journalism. But in spite of this fact—perhaps because of it—they have always a fascination for journalists. The roll includes men like W. H. Russell, Archibald Forbes and O'Donovan (*Daily News*), Wood and Cameron (*Standard*), Frank Power (*Times*), the late G. W. Steevens (*Daily Mail*), Charles Williams (*Daily Chronicle*), Winston Churchill (*Morning Post*), Frederick Villiers (*Graphic*), and Melton Prior (*Illustrated London News*). Speaking generally, all the serious dramatic, musical, and art criticisms, as well as the literary reviews, are now entrusted to men who are specially equipped for the task. The special correspondent stationed at one or other of the chief continental capitals is rarely chosen from the inside staff of the paper.

He—though, as in the case of the *Daily News* at Paris, it may be a lady (Mrs. Crawford)—is generally a person of high educational and literary attainments, of position and influence in that particular capital; and he receives his appointment because of his knowledge of its affairs, and of his means of access to important, and it may be exclusive, sources of political, social, and commercial information. Perhaps the most interesting and picturesque personality among 'Our Own Correspondents' has passed away (1903) in M. de Blowitz, who for many years represented the *Times* in Paris. See NEWSPAPERS.

Joust. See TOURNAMENT.

Jove. See JUPITER.

Jovellanos, GASPAR MELCHOR DE (1744-1811), Spanish author and statesman, born at Gijón; was for a time resident in England, and a friend of Lord Holland. He was a lawyer, minister of justice (1797), and a very prolific writer of political and economic works, greatly esteemed both for style and matter, and also of verse and poetic dramas. *El Delincuente Honrado* and *El Pelayo* are his principal plays, and *Mejico Conquistada* his best-known epic. He translated Young's *Night Thoughts* and the first canto of *Paradise Lost*. All his works are published in Rivadaneira's collection (vols. xlvi. and l.).

Jovian, whose full name was FLAVIUS CLAUDIUS JOVIANUS, was emperor of Rome from June 363 to February 364 A.D. He was born in 331, and was captain of Julian's life guards on the latter's expedition against the Persians, being elected emperor by the army after Julian's death in battle. He began to retreat, and was forced to purchase peace by surrendering five provinces. When he reached Mesopotamia he promulgated the famous edict which placed the Christian religion on a legal basis, thus putting an end to Julian's persecution.

Jowett, BENJAMIN (1817-93), tutor and master of Balliol College, Oxford (1870), exercised a great influence over the intellectual life of Oxford. He belonged to the Broad Church school, and was a contributor to *Essays and Reviews* (1860). He was appointed regius professor of Greek in 1855. In addition to his translation of the *Dialogues of Plato* (4 vols. 1871), he wrote a *Commentary on the Epistles of St. Paul to the Thessalonians, Galatians, and Romans* (2 vols. 1855); *College Sermons* (1895); and translations of *Thucydides* (2 vols. 1881) and of *The Politics of Aristotle* (1885). See E. Abbott and L. Campbell's *Life and Letters* (1897-9), and Lionel Tollemache's *B. Jowett* (1895).

Joyce's Country. See GALWAY.

J.P., Justice of the Peace.

Juan, DON. See JOHN OF AUSTRIA.

Juan Fernandez, group of three volcanic islands, on one of which (Más-a-Tierra) Alexander Selkirk was marooned in 1704-9, in the Pacific Ocean, about 380 m. w. of Valparaiso, Chile, to which they belong. Selkirk's adventures are said to have suggested *Robinson Crusoe* to Defoe.

Juan Manuel (1282-1347), grandson of Ferdinand III. of Castile, was one of the regents in the minority of Alfonso XI. (1312), and a moving spirit in the civil wars that ensued. He wrote chronicles and treatises, such as *Libro de Caza* (on hawking), *Libro del Caballero* (on the duties and carriage of a knight), and, best known of all, *Libro de los Estados* (a didactic political narrative). But his masterpiece is *Count Lucanor* (Eng. trans. 1888), a collection of amusing moral tales or apologues, resembling the *Arabian Nights*. See *Obras in Rivadaneira's collection*, vol. ii., ed. by Gayangos.

Juarez, BENITO PABLO (1806-72), president of Mexico, born of Indian parentage in the state of Oajaca, of which he was governor (1847-52). Forced in 1853 to leave Mexico during Santa-Anna's ascendancy, he returned in 1855 to join Alvarez, became minister of justice (1855), and secretary of the interior and chief-justice (1857), and finally was elected president in 1858. His suspension of payment of public debts caused an expedition by the French, who crowned the Archduke Maximilian of Austria Emperor of Mexico, and Juarez retreated to the northern frontier. In 1867 his followers succeeded in taking Maximilian prisoner, who was shot. Juarez retained the presidency until his death. See *Life* by U. R. Burke (1894).

Juba, riv., forming from about 6° N. lat. to its mouth the boundary between British and Italian E. Africa. It rises about 7° N. lat., and flows E. and S.E., then S., and empties at 0° 14' S. into the Indian Ocean. It is navigable for 140 m. above its mouth.

Juba. (1.) King of Numidia from about 61 to 46 B.C. In the civil war between Caesar and Pompey he took the latter's side, and after the battle of Thapsus, which Caesar won, committed suicide. (2.) Son of the above (d. c. 19 A.D.). Caesar took him to Rome as a child. There he gained the favour of Augustus, who in 30 B.C. restored him to his father's throne. In 25 B.C. Numidia was made a Roman province; and Augustus gave Juba the kingdom of Mauritania in exchange for it. He

wrote histories of Africa, of Assyria, of Arabia, of Rome, of the theatre, of painting, and also works on botany and grammar, all lost.

Jubal, the son of Lamech and Adah, was, according to Gen. 4: 21, the inventor of musical instruments. His name is doubtless connected with *yōbēl*, a 'ram's horn.' See JUBILEE.

Jubaland, prov. of British E. Africa, between Tanaland and Juba R. The n. and w. boundaries are still undefined. Exports include shee, gums, senna, ebony, manilla fibre, and ostrich feathers.

Jubbulpore. See JABALPUR.

Jubilatē, the 100th Psalm, which begins with that word in the Vulgate version. It is used as an alternative canticle for the *Benedictus* at morning service.

Jubilee, the fiftieth anniversary of any important public event, or the fiftieth year of any important institution. The sixtieth anniversary is termed the 'diamond jubilee.' The year of jubilee among the Hebrews recurred at intervals of seven sabbatical years (i.e. 7×7 years), was ushered in by the blowing of the *yōbēl*, 'ram's horn,' and was celebrated with universal rejoicing. Agriculture was brought to a standstill, mortgaged property was restored to its hereditary owners, and slaves of Jewish birth were liberated. In the Roman Catholic Church a jubilee feast was instituted by Boniface VIII. in 1300, and was intended to recur with every new century thereafter; but the interval was successively reduced by later popes to fifty, thirty-three, and twenty-five years. See Keil's *Biblical Archaeology* (1887), ii. 10-20.

Jubilees, THE BOOK OF, one of the Old Testament Apocrypha, called also the Little Genesis. The former name is due to the fact that the book divides the whole stretch of time between the creation and the arrival of the Israelites in Canaan into fifty jubilees of forty-nine years each, and describes the various incidents in this period by reference to the particular sabbatic year and jubilee in which it occurred. The other name of the book arises from its being a recast of the narrative given in Genesis, though, while it only gives a selection of the events, its lengthy comments and Midrashim legends actually swell it beyond the compass of the canonical book. Besides attempting to fix the early chronology more definitely, it seeks to explain the difficulties of the sacred narrative, and lays great emphasis upon religious seasons and observances. The complete book is extant only in an Ethiopic ver-

sion (found by Dr. Krapff in Abyssinia, and translated by Dillmann in Ewald's *Jahrbücher*, 1851-3; original published by Dillmann, 1859), but a considerable portion of a later translation has been issued by Ceriani, and extracts from the Greek version are found in the Byzantine theologians. It was probably written in Hebrew c. 125-100 B.C., but the Ethiopic translator must also have used the Greek version. See R. H. Charles's translation in *Jewish Quarterly Review* (1893-95), Ethiopic version (4 MSS. collated, 1895), and complete translation with introduction and commentary (1902).

Jucar, riv. of Spain, rises in the Sierra Albarracín, and flows s. and e. through remarkable defiles, and enters the Mediterranean 25 m. s.s.e. of Valencia. Length, 270 m.; area of basin, 7,620 sq. m.

J.U.D. (*Juris Utriusque Doctor*), Doctor of Laws—i.e. both of civil and canon law.

Judea, one of the districts into which Palestine was divided in the time of Christ. The captives who returned from Babylon were mainly of the tribe of Judah, and settled largely in the territory of the ancient kingdom of Judah. The name Judea sometimes connotes Galilee and Samaria as well—i.e. all Palestine west of the Jordan (Luke 23: 5; A.V. Jewry). The wilderness of Judea, or Judah, was the desert tract to the west of the Dead Sea, which is sometimes called Jeshimon in the Authorized Version.

Judah, the fourth son of Jacob, and the eponymous ancestor of the tribe of the same name. When the Hebrews settled in Canaan under Joshua, the tribe of Judah pressed southwards and established itself in a broad strip of territory to the west of the Dead Sea. It comprised the following four districts: the Hill Country, forming the southern portion of the great central ridge of Palestine; the Shephelah, to the west; the wilderness of Judah, or Jeshimon, to the east; and the Negeb, or South Country. The tribe seems to have absorbed large portions of the aboriginal clans. The first king of Israel, Saul, was a Benjamite; but from the accession of David his successor, the ascendancy of Judah becomes marked. The revolt of the ten tribes certainly put her supremacy in dispute; but Judah, with only one other tribe, Benjamin, on her side, was able to resist the eastern invaders for more than a century longer than did her northern rival. See ISRAEL.

Judah ha-Levi (c. 1085-after 1140), Jewish philosopher, poet, and physician, born at Toledo in Spain; was the greatest mediæval

poet who wrote in Hebrew. His poetry, largely adopted in the liturgy of the synagogue, reflects the sufferings as well as the aspirations of his people. He died in the Holy Land while on a pilgrimage there. Heine pays a fine tribute to him in his *Romancero*. Editions of his works by Edelmann and Dukes (1851), and *Divan des Abul-Hasan Jehuda ha-Levi*, ed. Brody (new ed. 1901). Nina Davis translated some of his poems as *Songs of Exile* (1901). See Kaufmann's *Jehuda Halevi* (1877).

Judaizers, those early Christian Jews who maintained that the sole difference between Christians and Jews was the acknowledgment on the part of the former that Jesus was the Messiah. They desired to force even upon the heathen converts of the new faith the observances of the Mosaic law, and this explains their extraordinary hostility towards Paul, who advocated Christianity as a universal religion. They long disputed the position of Paul, raised factions against him in many of the churches, and professed to adhere to the older apostles, especially Peter. See Conybeare and Howson's *Life and Epistles of St. Paul* (1852), ch. xiii.

Judas, 'not Iscariot,' one of the disciples of Jesus (John 14: 22), called also Judas the son (R.V.) of James (Luke 6: 16), is generally identified with Lebbaeus or Thaddæus. But some think that he was the successor of the latter in the discipleship.

Judas Iscariot, one of the disciples of Jesus, and His betrayer, is believed to have belonged to the village of Kerioth (whence his surname, 'Ish-Kariyoth'—i.e. 'man of Kariyoth'), now El-Karietein in S. Judah. When he became a disciple, he was chosen to carry and administer the funds (John 13: 29). To this position he proved unfaithful, and displayed the grasping disposition which ultimately led him to betray Jesus to the Jewish authorities for thirty pieces of silver. Overcome with remorse at the dreadful outcome of his crime, he committed suicide, of which rash act two accounts are given (Matt. 27: 3 f.; Acts 1: 18). De Quincey and others have maintained that the dark deed of Judas was dictated solely by the desire to force the hand of Jesus—i.e. to compel Him in self-defence miraculously to substantiate His claim of Messiahship; a view hardly consonant with the express statements of the gospels. See Lives of Christ as given under JESUS CHRIST. Daub's *Judas Iscariot* (1816-18) is a profound and ingenious work founded on the New Testament narrative.

Judas Maccabæus, the deliverer of the Jews from the Syrian yoke in the reign of Antiochus Epiphanes, was the third son of Mattathias, the priest who began the revolt. Judas met and routed in succession the Syrian generals Apollonius and Seron (1 Macc. 3), and captured Beth-horon; defeated Ptolemy, Nicanor, and Gorgias near Mizpeh, and Lysias at Beth-zur (164 B.C.). He then devoted himself to the purification of the temple at Jerusalem. He subsequently made successful attacks upon the neighbouring tribes, Edom, Ammon, etc.; but after the death of Antiochus (164) his good fortune began to desert him. He suffered a repulse at Beth-Zacharias; and although he again defeated Nicanor at Adasa (161), his army, now shrunk in numbers, was crushed by a large force under Bacchides at Elasa, and himself slain (1 Macc. 9). Judas had every gift of a great general—bodily strength, ready judgment, power of organizing, courage, zeal, and, above all, faith—and is to be regarded as one of the most heroic figures in the history of Israel. His career forms the subject of one of Handel's greatest oratorios, *Judas Maccabæus*. See 1 Maccabees, and art. MACCABEES.

Judas the Gaulonite, or **JUDAS OF GALILEE**, raised a Jewish insurrection against 'the taxing' under the Roman governor Quirinus (A.D. 6), in which he was killed. See Josephus (*Antiquities*, xviii. 1), and Acts 5:37.

Judas Tree, a name sometimes applied to the elder tree, and to various trees belonging to the leguminous genus *Cercis*, each in turn reported to be the tree on which Judas hanged himself. *C. siliquastrum* is the species most frequently meant. This is a native of S. Europe, and has attractive papilionaceous flowers, purple in colour.

Judd, JOHN WESLEY (1840), English geologist, born at Portsmouth; joined the staff of the Geological Survey (1867), and devoted himself especially to the geology of Lincolnshire and Rutland, and later the Highlands of Scotland. In 1876 he was elected professor of geology in the Royal School of Mines. Chief works: *Geology of Rutland* (1875); *Volcanoes* (1878); *The Student's Lyell* (1896).

Jude, THE EPISTLE OF, one of the shortest of the New Testament books, purports to have been written by Jude (Judas), who, as the brother of James (ver. 1), would be one of the 'brethren of the Lord' (Gal. 1:19; Matt. 13:55). The letter is addressed to Christian saints in general, and is mainly composed

of warnings against false teachers. Its single chapter, both in substance and in language, bears a remarkable similarity to 2 Peter, especially ch. 2:1-19; and scholars generally incline to regard the latter as the derivative document, though Spitta, Zahn, and others hold the reverse view. The epistle also reveals many assanances with the Book of Enoch. The Tübingen school, and many recent critics, see in Jude a pseudonymous work of the late 2nd century; but there are strong names, both English and German, on the side of its authenticity, and a date agreeable thereto. Commentaries by Plumptre (*Camb. Bible*, 1880), Lumby (*Speaker's*, 1881), Plummer (*Expos. Bible*, 1891), Kühl (*Meyer's*, 1897), Von Soden (*Kurzer Hand-Commentar*, 1899).

Judge, the general name for all persons who are invested with authority to determine civil or criminal causes and administer justice. The title of the judges of the High Court in England is 'Mr. Justice,' and of those of the Court of Session in Scotland 'Lord.' When acting in their judicial capacity, both are addressed as 'My Lord.' The judges of the superior courts, except the lord chancellor, are appointed by the crown by letters patent under the great seal, hold office during good behaviour, cannot be removed except on an address to the crown by both Houses of Parliament, and may not sit in the House of Commons. The lord chancellor is appointed by delivery to him of the great seal, and he retires from his office with the ministry to which he belongs. The judges of the English courts of inferior civil jurisdiction are the county court judges, who are appointed by the chancellor, have the title of 'Judge,' and are addressed as 'Your Honour.' The inferior criminal jurisdiction is in the hands of the justices of the peace, in quarter sessions and petty sessions, in the counties, except in the county of London, where the criminal jurisdiction of quarter sessions is exercised by a paid chairman and deputy-chairmen, who are lawyers by profession, and may each hold the court alone; and the jurisdiction of petty sessions belongs to the police magistrates, and in the towns it is in the hands of the borough justices, or the stipendiary magistrates, and the recorders. In Scotland the larger part of the inferior jurisdiction, both civil and criminal, is exercised by the sheriffs. No proceedings will lie against a judge for anything done in the discharge of his judicial duties if he keeps within his jurisdiction. In the United States the judges of

the supreme court are appointed by the president, with the consent of the Senate. In most of the separate states of the union the judges are appointed by popular election, and hold office only while their political party is in power. In most foreign countries judges are not appointed, as in Great Britain, from the bar, but the judiciary forms a separate profession.

Judge Advocate-General, an official appointed by the crown, as its adviser on matters of military law. Mr. T. Milvain, K.C., M.P., at present holds the office. He has power to revise the sentences passed by courts-martial. The presence of the deputy judge advocate, appointed by the judge advocate-general to act as a legal assessor, is required at all general courts-martial. In India, the judge advocate-general's branch is composed entirely of military officers (eleven), appointed by the Indian government. The judge advocate of the fleet holds a similar position in relation to the navy.

Judges, THE BOOK OF, narrates the history of Israel from the death of Joshua till the time of Samuel. After an introduction (ch. 1-3:4), recounting Israel's difficulties in subjugating the whole land, it gives the histories of the several 'judges' in their long-protracted struggle with internal or external foes—*viz.* Othniel, Ehud, Shamgar, Deborah (with Barak), Gideon (with Abimelech's usurpation), Tola, Jair, Jephthah, Ibzan, Elon, Abdon, and Samson (ch. 3:5-16). Ch. 17-20 form a sort of appendix treating of two sinister episodes of the period. The book shows a relatively simple structure; the history of the earlier judges is largely cast according to the following recurrent cycle of events:—Israel sins, is given over to the enemy, and sore oppressed for a period; is then delivered by the particular judge, and has rest for (mostly) forty years. Parts of the book, notably the song of Deborah (ch. 5), are undoubtedly very ancient; and the compiler, writing after the captivity of the ten tribes (*cf.* 18:30), seems to have availed himself of written sources throughout, though how far such sources can be identified with the various strata of the Pentateuch (see HEXATEUCH) is a moot point. The Septuagint version of Judges is extant in two main recensions, which show considerable divergences in both facts and language. Commentaries by Bertheau (1883), Lias in *Camb. Bible* (J. S. Black, *Smaller Camb. Bible*), Oettli (1893), Moore (*Internat. Crit. Com.*, 1895), Budde (*Kurzer Hand-Commentar*, 1897).



1. Lord Alverstone, Lord Chief-Justice of England. 2. Lord Macnaghten, Lord of Appeal. 3. Lord Davey, Lord of Appeal. 4. Lord Robertson, Lord of Appeal. 5. Sir R. H. Collins, Master of the Rolls. 6. Sir Robert T. Reid, the new Lord Chancellor. 7. Right Hon. J. Atkinson, Lord of Appeal. 8. Sir J. G. Barnes, President of the Probate, Divorce, and Admiralty Division. 9. Lord Dunedin, Lord President of the Court of Session, Scotland. 10. Lord Kingsburgh, Lord Justice-Clerk, Scotland. 11. Lord Justice Walker, the new Lord Chancellor of Ireland. 12. Lord O'Brien, Lord Chief-Justice of Ireland. (Photos 1, 2, 4, 6, 8, 9, 10, and 12 by Elliott & Fry; 3 and 5 by Russell & Sons; 7 by Chancellor, Dublin; 11 by Lafayette, Dublin.)

Judgment, in psychology, is the mental act by or in which a predicate is affirmed or denied of a subject; in logic, the affirmation or denial itself, which, as expressed in language, is called a proposition. Judgment so defined is the unit of all thought, for definite thinking is made up of judgments, and short of judgment there can be neither truth nor falsity. An idea is in itself neither true nor false; it becomes so only as referred implicitly or explicitly to a subject. Consequently the judgment is the true starting-point in logic, although it has been the more usual practice of the text-books to start with the concept. The fundamental nature and significance of judgment or predication — 'the import of propositions,' as it is sometimes phrased — has been one of the standing problems of logic, and leads into equally difficult problems of metaphysics — e.g. the controversies of nominalists, conceptualists, and realists in mediæval philosophy. For the best modern opinion, see Bosanquet's *Logic*, vol. i.

Judgment, THE LAST, in Christian theology, the final determination of the destinies of men, to be made at the last day. In the Old Testament the 'day of the Lord' was awaited as the time of Israel's salvation, but in the mouth of Amos (5:18 f.) it becomes a day of judgment, which will sift even the chosen nation, and bring to destruction all that is unworthy. After the exile, the hope of a glorified and triumphant Israel gradually gave way before the idea of a kingdom of heaven to be established upon the earth, and ushered in by a great catastrophe. When the belief in a personal resurrection had been fully developed, as in New Testament times, we find Jesus speaking of a tremendous crisis, both for the world and for individuals, which is to take place at the end of the age, when He will return, and bring the living and the dead before Him for final arbitrament. There seems little doubt that this transaction is represented in Scripture as an event — the *day of judgment*. But, on the other hand, it is manifest from several passages (John 3:18 f.; 12:31) that the destinies of men are being fixed even now, and that death closes their account; in which case one naturally asks what is left for the day of judgment to decide. Again, it is not false to Scripture to recognize that a subject like this is spoken of in highly figurative terms: compare Peter's interpretation of Joel's 'day of the Lord' (Joel 2:2 f., 28 f., and Acts 2:16 f.). Whatever the solution may be, it is certain that Christ

is to be the principal of the last judgment (Rom. 14:10; 2 Cor. 5:10), and that men's ultimate fate will be determined by their relation to Him. See Dorner's *Christian Doctrine* (trans. 1880-2), iv. 415 f.; an excellent section in Kaftan's *Dogmatik* (1897), s. 70, *et seq.*

Judgments Extension Acts (1868 and 1882). The Act of 1868 provided that a certificate of judgment for any debt, damages, or costs in any common law court in England or Ireland, or in the Court of Session of Scotland, might be registered in the other or others of these countries, and on being registered should have the same force as if it had been originally obtained in the country in which it was registered. By the Judicature Acts of 1873 the chancery courts of England were included in this law, and by the Inferior Courts Judgments Extension Act, 1882, the law was extended to the inferior civil courts in the three countries.

Judicature Acts. The first of these acts, which revolutionized the practice of the Supreme Court in England, was passed in 1873, and subsequent acts were passed in 1875, 1877, 1881, 1884, 1890, and 1891. Generally the acts have defined the jurisdiction and duties of the various courts, giving to all of them the right to administer both law and equity, which were formerly separate; and they have simplified and shortened legal proceedings.

Judicial Committee. See PRIVY COUNCIL AND APPEALS.

Judicial Factor. See FACTOR, JUDICIAL.

Judicial Separation. The judicial separation of husband and wife may be accomplished either by a decree of the divorce court, or by an order of a court of summary jurisdiction. The divorce court only grants separation for adultery, cruelty (moral or physical), desertion for two or more years, or sodomitical practices. Non-compliance with a decree for restitution of conjugal rights is equivalent to two years' desertion. In a petition by a wife, a decree for alimony may also be obtained. The court pronouncing a decree may declare the parent whose misconduct occasions the separation unfit to have the custody of the children of the marriage. By the Summary Jurisdiction (Married Women) Act, 1895 (which does not extend to Scotland or Ireland), on proof that a husband has (1) been convicted of an aggravated assault on his wife, or (2) been indicted and convicted of an assault on her, and fined £5, or given two months' imprisonment, or (3) deserted her, or (4) wilfully neglected to maintain her and her

children, a court of summary jurisdiction may grant to the wife a judicial separation, the custody of children under sixteen, and a payment of a weekly sum not exceeding £2. Such an order cannot be made if the wife has been guilty of adultery, unless it was condoned or connived at by the husband. The order comes to an end if cohabitation is resumed. In Scotland the only ground for judicial separation is cruelty or adultery. The Conjugal Rights (Scotland) Amendment Act, 1861, enables a deserted wife to obtain a protection order as to her property in the event of desertion or separation.

Judicial Trustee. Under the Judicial Trustee Act, 1896 (which does not extend to Scotland or Ireland), and the rules under the act (Aug. 31, 1897), the court may appoint a judicial trustee of trust property, either alone or in addition to existing trustees, on the application of the person creating the trust, or of a trustee or a beneficiary. A judicial trustee may be either the official solicitor or a person nominated by the applicants. He is under the control of the court, and is generally remunerated.

Judiciary. In primitive society the guardians and interpreters of those superstitious rules which are the nearest approach to laws are the medicine men or soothsayers. In the stage above fetishism, the tribal chief, with his council of elders, is naturally the expounder of those general customs which are supposed to have been enjoined by the ancestors of the community; while the special customs of each household were guarded by its house father. Such seems to have been the state of things in Sparta until the institution of the ephorate reduced the powers of the tribal kings, and in Rome before the Twelve Tables. In Athens, the revolt against aristocratic privileges resulted in the partial destruction of the professional character of the judges, and the substitution of a lay tribunal. While in specially important cases the council of the Areopagus continued the tradition of the aristocratic period, the great bulk of the judicial work was done by the *Diaitetai*, who were ordinary citizens too old for military service, and by the *Heliasts*, who sat in assemblies containing great numbers of their body. It is a misleading use of language to describe these lay judges as 'jurors.' Their functions were to decide questions of law as well as of fact, and where the laws were silent they were entitled to exercise their own discretion. The Roman *judex* of the republican and imperial periods was per-

haps more like a modern jurymen; but at Rome, at least in republican times, the presiding judge or magistrate was also a layman. The professional magistrature was a product of the empire.

In the early middle ages the bourgeois courts were wholly unprofessional in character; so also were the feudal hierarchy. But the courts of the king and the church gradually became professional in character—the former, no doubt, because the wealth of the crown made it possible for the king to pay his servants, and thus to produce a competition for the posts. Almost the only exception to this rule is the case of the English justices of the peace, who, though originally paid officials of the crown, never acquired a professional character, and perhaps really continued under slightly different traditions of feudal jurisdiction. But although ‘professional,’ the royal judges were not forensic. In other words, they were not chosen by the crown from among the most successful of the legal profession. That is a peculiarity which long distinguished, and still distinguishes, the British and American bench from the tribunals of almost all the rest of the world. In most countries the judicial profession is perfectly distinct from the forensic. The judge is as purely a government official as a policeman or a sanitary inspector. He begins his duties in some petty tribunal, and is gradually promoted to more responsible posts. One of the most curious facts in the history of the judicial office is the absolutely proprietary character which it obtained in France. Seats in the highest tribunals, the *parlements* of Paris and the provinces, were freely bought, sold, and inherited. Strange to say, the system did not work badly. The judges, having permanence of tenure, maintained a bold front against royal aggression, except at such times as the system underwent renewal.

JUDITH, THE BOOK OF, one of the Old Testament Apocrypha. It records how Holofernes, at the head of 132,000 troops, had been commissioned by Nebuchadnezzar to take vengeance on the countries, including Judæa, which had not aided the king in the war against the Medes; and how, while he was besieging Bethulia, Judith, a Jewish widow, gained access to him by her beauty, and, having drugged him with wine, cut off his head—a deed which emboldened the Jews to fall upon the leaderless Assyrians, who were routed with immense slaughter. The story can have no possible historical setting, and is either

simply a tradition of obscure origin, or a kind of allegory designed to show forth the great Maccabean triumph. The work probably originated in the 1st century B.C. It contains numerous parallels with the books of the Maccabees, and is referred to by Clement of Rome (*Ad Cor.* i. 55). It seems to have been originally written in Hebrew: Jerome states that his translation was made from a Chaldean text; but it is probable that the Septuagint version is older than any of the Hebrew recensions now extant. As a work of literary art Judith takes high rank, but its religious atmosphere is that of the legalism and the bigoted nationalism characteristic of the closing centuries before Christ. See Ball in *Speaker's Com.*; Löhr in *Apocryphen und Pseudepigraphen* (1898).

JUDITH, an epic fragment of about 350 lines; the whole poem probably contained 1,300 or 1,400 lines. The cantos that have survived contain one of the spirited battle-pieces for which Old English poetry is justly famous. The source of the poem is certain chapters (especially xiii.-xv.) in the apocryphal *Book of Judith*. The date of composition seems hopelessly disputable. If, as is believed, the *Battle of Brunanburh* shows imitation, 937 A.D. is the downward limit; the present writer would assign it to the 8th century. The standard edition is Professor A. S. Cook's (Boston, U.S.A.). Consult also Foster's *Judith: Studies in Metre, Language, and Style*.

JUDSON, ADONIRAM (1788-1850), American missionary, was born at Malden, Massachusetts. He settled in Burma, under the auspices of the American Baptist Missionary Union (1814). With his first wife, Ann Hasseltine, till her death in 1826, he laboured at Rangoon, Ava, Amherst, and in other parts of Burma, issuing a translation of the Bible into Burmese (1852), and a *Burmese and English Dictionary* (1852). Judson is always regarded as one of the greatest of Indian missionaries. See *Lives* by Wayland (1853) and Edward Judson (1883).

JUEL, NIELS (1629-97), Danish admiral, born at Christiania in Norway; fought under Tromp and Ruyter against the English and the Barbary corsairs; entered the Danish service (1656), and distinguished himself in the wars with Sweden (1659-60 and 1675-79), his principal exploit being the victory of Kjöge Bay (July 1, 1677).

JUGGERNAUT. See PURI.

JUGGLING is often confused with conjuring, though the two arts are quite distinct. In an exhibition of juggling there is no

concealment of method, and there is no deception; in an exhibition of conjuring we have both concealment of method and deception. A juggler may be said to perform feats, while a conjurer may be said to perform tricks. Swallowing a sword is a juggle when the sword is actually swallowed; it is a conjure when performed by a trick-sword which receives the blade into the handle. Mr. Maskelyne says that any one can become a juggler at the cost of seven years' practice, seven hours a day; and any one can become a conjurer by acquiring the different necessary mechanical appliances and learning how to use them. But that will not necessarily make one a Cinquevalli or a Treway in the art of jugglery, nor a Houdin or a Hermann in the realm of magic. Juggling is, in fact, the art of muscular precision; for it is muscular precision that enables the juggler to toss an egg or a cannon-ball into the air and to catch either on a china plate without in the one case breaking the egg, or in the other breaking the plate. The ancient jugglers, jocolators, or jongleurs seem to have given only a kind of rough and general acrobatic and gymnastic display, and to have shown in their feats none of the neatness and finish we look for in juggling performances to-day. Perhaps the most pleasing jugglers are the Japanese. This is not due to any greater dexterity on their part, but to their quiet, grave style and their humour, which are greatly assisted by their garb. Common Japanese juggles are with the umbrella and with the spinning-top. The performers lie on their back, and manipulate the umbrella with their toes in a manner that would be astonishing even when done by the hands and in a natural position. In juggling with tops, the Japanese juggler will keep them spinning an amazing length of time, and make them spin up a cord to the top of a high building.

JUGLANDEÆ, an order of mostly North American shrubs and trees, some of which have economic importance, their wood being employed in cabinet work. The staminate flowers are borne in catkins, the pistillate in racemes or terminal clusters. The fruit is a drupe.

JUGLANS, a genus of deciduous trees belonging to the order Juglandæ; the common walnut tree, *J. regia*, is the best-known species. The fruit of all the species is edible; and the timber of most, especially of *J. regia* and *J. nigra*, is of great value. All are handsome, and the harder species make splendid park trees

in Britain. The fruit of *J. cinerea*, the white walnut tree, is the butter nut of America. The fruit is a large drupe with a fleshy tough epicarp and a two-valved endocarp. A rich, deep, but well-drained soil suits the walnuts, but they will not often train in exposed situations.

Jugular Veins. The number varies in different individuals, and the size of each is also indeterminate. Generally, however, on each side an external jugular vein transmits the blood from the scalp and deeper parts of the face to the subclavian; a posterior external jugular collects the blood from the back of the neck and opens into the external jugular; an anterior jugular passes from the submaxillary region to the external jugular or to the subclavian; while the internal jugular draws the blood from the interior of the cranium and from the superficial parts of the face. The internal jugular unites at the root of the neck with the subclavian vein to form the vena innominata. Cases of death occurring within a few seconds of the 'jugular' being severed may be attributed to wounds of the carotid; but a slower form of death often follows a wound of one of the jugular veins, and is due to the admission of air through the opened vein to the cardiac chambers. Apart from this danger, a wound of a jugular vein is usually of minor importance.

Jugurtha, king of Numidia in Africa. Micipsa, Jugurtha's uncle, brought him up with his own sons, Hiempsal and Adherbal; but, observing his ambitious nature, he sent him with an auxiliary force to aid Scipio in the conquest of Numantia in 134 B.C., possibly hoping that he might perish in battle. When Micipsa died in 118, he left his kingdom equally to his two sons and Jugurtha; but the latter soon murdered Hiempsal. The Romans then interfered, but Jugurtha prevailed on them to assign to him the western and better half of the kingdom; then he declared war upon Adherbal, and, after some fighting, captured him and put him to death in 112 B.C. The Romans now declared war on Jugurtha, who defeated them in 110 B.C. After that Cæcilius Metellus took command, and during two years frequently defeated Jugurtha; then he was superseded by Marius, who, after defeating Jugurtha, got possession of him, betrayed by his father-in-law, Boechnus, king of Mauritania. Jugurtha adorned Marius's triumph, and was executed in Rome. He is the subject of the *Jugurtha* of Sallust, one of the most vivid pieces of historical writing in the Latin language.

Ju-Jitsu, or JIU-JITSU, the Japanese art of self-defence, is of great antiquity, but until recent years was practised only by the Samurai, the governing and military caste of Japan; it was an essential part of their elaborate training, and the exclusive knowledge of it was considered necessary to their predominance. In the late Japanese renaissance much wider functions were given to it; originally for self-defence purely, it came to be valued as a means to health and general physical efficiency, and, finally, in the training of character. For the end of ju-jitsu is to make a man independent of weapons and mere strength—able to meet any opponent successfully with his bare body; and proficiency therein helps to self-confidence and a tranquil mind in the face of unforeseen difficulties. The emperor of Japan and many leading statesmen took this high view of the possibilities of ju-jitsu; the training was thrown open to the whole people, and made compulsory for army, navy, and police; every encouragement was given by the government; it was taught in most schools; a great national society of ju-jitsu, now having one and a half million members, was formed, with local branches all over Japan. In consequence, the art is now held in high esteem by the people, and some slight knowledge of it is almost universal; and it has found this special sanction from the Russian war, that the proficients in ju-jitsu have turned out particularly effective in the field. As a consequence of these changes the methods of ju-jitsu have undergone considerable development, differing in different parts from one another and from the older art; hence some contradiction in the writers on the subject, who have derived their knowledge from different schools.

Ju-jitsu means literally 'the gentle art.' It opposes knowledge and skill to brute strength more successfully than any other mode of self-defence, and promises to teach a feeble youth to overcome a giant less skilful than himself. Its principle is to use a man's weight and strength against himself. An opponent's blow that cannot be resisted can be turned; the triumph of ju-jitsu is to turn it to his own downfall.

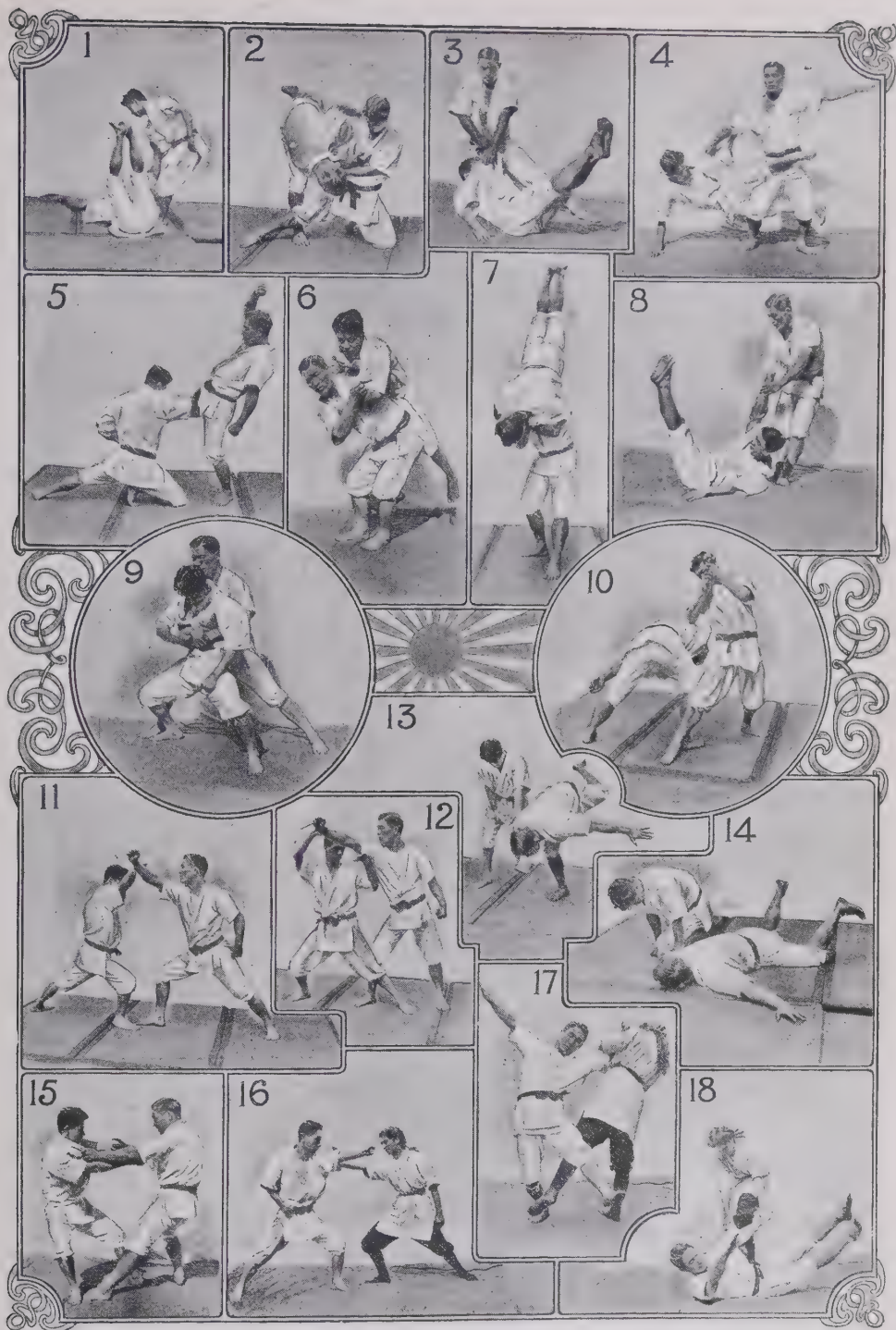
It is a common misconception to regard ju-jitsu as a collection of elaborate tricks that must be learned mechanically. In the most fruitful teaching it is far otherwise. The pupil is shown a few elementary methods of falling without hurt, of throwing an opponent, of rendering him helpless when down, and then is set to work to put these in practice

in rough-and-tumble encounters. The trick itself is a small thing; judgment in attempting it, skill and quickness in carrying it out are the weighty matters, and these can only be learned by using the brains in frequent practice; in the course of which, according to his capacity and persistence, the student will arrive naturally, with the help of a few hints, at the more elaborate developments of the art.

It will be easily seen that the qualities to be cultivated are quickness and suppleness and a delicate perception of balance. Stiffness is unpardonable, and it is a great mistake to offer a dull resistance to the stress of assault instead of yielding to it and cultivating an elastic and aggressive recovery.

This fascinating game (for so it appears to Western students of it) appears to throw some light on the problem of maintaining a healthy and vigorous body to the man whose work buries him in large cities. It is now (1905) on its trial in England; the police authorities have practically recognized its importance; army and navy are experimenting with it hopefully; many eminent medical men have smiled cordially upon it; and it may well develop into a social factor of considerable importance.

The first thing that must be learned is the art of falling without shock or injury. The natural man usually falls on a joint—i.e. either on the base of the spine, the elbow-joint, or the wrist. Thus injury is caused. In the ju-jitsu method of falling, the violence of the shock is taken by pads of muscle on the arm, leg, or foot. Figs. 1 and 3 show the shock taken by the arm. Fig. 2 shows how a ju-jitsu throw depends entirely on position and balance, and not on strength; Fig. 4, how a man's balance may be disturbed without coming within range of his fists. The other illustrations depict various movements and methods of defence and attack, thus:—Fig. 5. To counter a blow from knife or fist, dive down to a kneeling position, press suddenly against the groin with the whole weight of the body, at the same time pulling away the man's leg, held just behind the ankle. Figs. 6, 7, and 8 show the shoulder throw. Opportunity serving you, twist yourself in under your opponent's centre of gravity. Then suddenly, by straightening yourself, you will rotate him over into position shown in Fig. 7. The correct position in falling is shown in Fig. 8. Figs. 9 and 10 show first the escape from a seizure from behind, and, secondly, a sequel disconcerting to the aggressor. A blow on the small bones of the



Illustrations of Ju-jitsu.

(For explanation, see text.)

(Photographed by special permission at the Japanese School of Ju-jitsu, Oxford Street, London.)

hand will loosen for a moment its grip. The arm is instantaneously seized and twisted into the position indicated in Fig. 10. Pain may then be applied at leisure. Figs. 11, 12, 13, and 14 show the critical moments in a ju-jitsu defence against a knife. Following on a square parry the wrist is gripped and twisted. Step in under the man's extended arm, and as your hips come well under the arm, reach up, and with a firm pressure (applied with the stiff edge of the hand) roll over his triceps. His arm, thus attacked in two places, will give to your twist. His body must follow the twist into position shown in Fig. 14, and thence to the floor. In Fig. 14 you have but to kneel on his elbow-joint to cause his grip of the knife to relax. The knife can then be secured. Fig. 15. Just as in boxing, the combatants keep in continual motion. Fig. 15 shows a critical moment in which something is about to happen. Figs. 16, 17, and 18. A left lead at the head is parried sharply across, the sleeve is instantaneously gripped, and a second grip secured on the wrist. In Fig. 17 the lady has swung herself into a position from which she can deliver a backward kick. His supporting leg thus knocked away, the man is easily pulled down. At the very moment of his fall (Fig. 18) the lady has put her foot upon the man's side, and is in the act of breaking the elbow-joint across her shin.

The reader is advised, however, that the complicated nature of many ju-jitsu movements renders the practice of them undesirable until the beginner has grasped the simple elementary principles upon which all of them are based. See Skinner's *Ju-Jitsu* (1905), and Hancock and Higashi's *The Complete Kano Ju-Jitsu* (1905).

Ju-Ju, a name given by West African negroes to any fetish, whether an idol, or a magic rag, or anything else used as a charm. The word also denotes witchcraft and whatever is regarded as supernatural. The 'Long Ju-Ju' of the Nigerian Aros was a sacred shrine (and equally the oracle of the shrine), held in such high regard that pilgrimages were made to it from great distances. It was the scene of human sacrifices and other savage rites. For an illustration of it, and an account of its destruction by the British punitive expedition of 1901-2, see the *Graphic* of March 1, 1902. See also De Cardi's 'Ju-Ju Laws and Customs in the Niger Delta,' in *Jour. Anthropol. Inst.*, Aug.-Nov. 1899.

Jujube, a medium for the administration of drugs to be brought into contact with the mucous membrane of the throat. They are

made by heating two parts of gum-arabic and one part of sugar in water, and stirring until all is dissolved. The mixture is then strained and evaporated until it thickens to the right degree of viscosity. The flavouring, colouring, or medicinal ingredients are then added; and the resultant mixture is poured on to oiled trays or moulds to cool and dry. In making the so-called 'glycerin pastilles,' one-eighth part is added to the above. The common jujubes are made by soaking five ounces of gelatin in a pint of water for two or three hours, carefully heating till dissolved, then adding three ounces of glycerin and five ounces of pure white sugar.

Jujuy. (1.) Province in N.W. of Argentina, bordering on Bolivia. It is occupied by ranges of the Andes (Cordillera Real) rising to 18,000 ft., while the lowest point is 1,300 ft. above sea level. Agriculture is the chief occupation. Copper, silver, gold, lead, and antimony exist, and some of the mines are exploited. Area, 18,980 sq. m. Pop. (1902) 54,287. (2.) Capital of above prov., founded in 1593, near the Grande or San Francisco R., 970 m. by rail N.W. of Buenos Ayres. Alt. 4,035 ft. Pop. about 5,000.

Jukes, JOSEPH BEETE (1811-69), English geologist, born at Summerhill, Birmingham; studied under Sedgwick at Cambridge, and was appointed geological surveyor of Newfoundland (1839). After accompanying an expedition to survey Torres Strait, New Guinea, and the coast of Eastern Australia (1842-6), he held the posts of director of the Geological Survey in Ireland (1850), and lecturer at the Royal College of Science, Dublin. Among his publications are *Excursions in and about Newfoundland* (2 vols. 1842); *A Sketch of the Physical Structure of Australia* (1850); *Popular Physical Geology* (1853); *a Student's Manual of Geology* (1857); and a geological map of Ireland. See *Letters of J. Beete Jukes*, ed. by his sister (1871).

Julfa. See ISPAHAN.

Jülg, BERNHARD (1825-86), German philologist, born at Ringelbach in Baden; was professor of classical philology at Lemberg (1851-3), Cracow (1853-63), and Innsbruck (1863, until his death). He was one of the greatest European folklorists of modern times. He published an edition of Vater's *Litteratur der Grammatiken, Lexika, und Wörterbücher aller Sprachen der Erde* (1847); *Die Märchen des Siddhi-Kür* (1866); *Mongolische Märchensammlung* (1868); and *Die griechische Heldensage im Widerschein bei den Mongolen* (1869).

Julia, several ladies of the Julian clan at Rome. (1.) The sister of Julius Cæsar; was the grandmother of Augustus. (2.) Julius Cæsar's daughter; married Pompey in 59 B.C., and died in childbirth in 54. (3.) The daughter of Augustus, by Scribonia. She was born in 39 B.C., and married first, in 25 B.C., to Marcellus, who died in 23; and then to M. Agrippa, by whom she had three sons—Gaius and Lucius Cæsar, and Agrippa Postumus—and two daughters, Julia and Agrippina; and thirdly, after his death in 12 B.C., to Tiberius, who was afterwards emperor. Her immorality was notorious, and in 2 B.C. she was banished by Augustus to Pandataria, an island off the coast of Campania, and died there in 14 A.D. (4.) Daughter of the above; she married L. Æmilius Paulus; like her mother she was openly immoral, and in 9 A.D. was banished by Augustus to the island of Tremnus, off the Apulian coast. She died in 28 A.D.

Julia Gens, the Julian clan, a famous house in ancient Rome, which claimed its descent from Iulus, the son of Æneas, and so from Venus. No doubt it originally belonged to Alba, and removed to Rome when the former city was destroyed and incorporated with the Roman state by Tullus Hostilius. The family names of the clans were Iulus, Cæsar, Mento, and Libo. See Baring-Gould's *Tragedy of the Cæsars* (1892).

Julian, whose full name was FLAVIUS CLAUDIUS JULIANUS (331-363 A.D.), surnamed the Apostate, was the son of Julius Constantius, and nephew of Constantine the Great. He and his elder brother Gallus alone of the imperial family were spared by Constantius II. when on his accession he massacred all the descendants of Constantius Chlorus by Theodora. In 355 Julian was allowed to live in freedom at Athens, and in the same year was invested with the dignity of Cæsar, and given the government of the provinces beyond the Alps; he was also married to Helena, Constantine the Great's youngest child. In 357 he gained a great victory over the Alemanni, and invaded their territory in that year, and also in 358 and 359. He fortified the island at Lutetia (Paris), where he usually lived, and built baths there (ruins near the Musée Cluny). In 360 his soldiers proclaimed him emperor; but on Nov. 3, 361, Constantius died, and Julian was left undisputed emperor. He had long ceased to be a Christian, disgusted by the hypocrisy of the cruel Constantius and the mutual intolerance of the Orthodox and Arian Chris-

tians, and at once proclaimed a general toleration of all religions, choosing, however, his own officers from the pagans, forbidding Christians to teach rhetoric and grammar in the schools, and, to annoy them, allowing the Jews to rebuild their temple at Jerusalem. After spending some time at Antioch, he set off to invade Persia in March 363; he crossed the Euphrates and the Tigris, and took up his position before the walls of Ctesiphon, the Persian capital. A treacherous Persian nobleman persuaded him to march inland to meet the king, Sapor; but he was forced to retreat, harassed by the Persians, and was shot in a rear-guard action by an arrow, and died.

Julian was a ruler of great ability, and a very prolific writer on all sorts of subjects. His most interesting work is *The Cæsars*, or *The Banquet*; a great work, *Against the Christians*, is lost. The whole of his works have been edited by Hertlein (Teubner Series, 2 vols. 1875-6); *The Cæsars*, by Hersinger (1741) and Hazen (1785). It and some other of his works were translated into English by J. Duncombe (1784). See Rendall's *Life and Times of Julian* (1879); Gardner's *Julian* (1895); and Negri's *Julian the Apostate* (trans. 1905).

Julian Calendar. See CAL-
ENDAR.

Jülich, or JULIERS, tn., Prussian prov. of Rhineland, 17 m. by rail N.E. of Aix-la-Chapelle, the chief town of the former duchy of Jülich. Pop. (1900) 5,459.

Jülicher, ADOLF (1857), German New Testament scholar, was born at Falkenberg, near Berlin; became professor of New Testament history at Marburg in 1888. His chief works are *Die Gleichnissreden Jesu*, i. (ed. 2, 1899), ii. (1899); *Einleitung in das N.T.* (ed. 4, 1901; trans. 1903). Among living scholars Jülicher takes high rank, both as exegete and as critic.

Julien, STANISLAS AIGNAN (1799-1873), French Chinese scholar, was born at Orleans. Becoming conservator of the Bibliothèque Impériale (1839), in 1854 he was appointed the head of the Collège Impérial. He made numerous translations from the Chinese, among which are the plays, *Tschao-chi-kou-eul* (The Chinese Orphan), and *Hoei-lan-ki* (The Chalk Circle). He also translated some Chinese romances; *Avadanas*, a collection of Chinese tales; Chinese works of philosophy, as the *Livre de la Voie et de la Vertu*; and the valuable *Histoire de la Vie d'Houen-Tsang et de ses Voyages* (1851); and wrote *Syntaxe Nouvelle de la Langue Chinoise* (1867-70).

Julier Pass (7,504 ft.) is in the Swiss canton of the Grisons, and by carriage road connects the Rhine and Inn valleys. It was much frequented, being the shortest route from Coire to the Upper Engadine. It is now superseded by the railway under the Albulia Pass (opened 1903).

Julius I. (337-352), pope, born at Rome; was a vigorous supporter of Athanasius against the Arians. Two of his *Epistles* are extant, addressed to the people of Antioch and Alexandria respectively.

Julius II., GIULIANO DELLA ROVERE (1443-1513), was nephew of Sixtus IV., and was chosen pope (1503). A great fighter and successful politician rather than an ecclesiastic, he recovered Romagna from the Borgias, and devoted all his energies to the re-establishment of the papal sovereignty and the extinction of foreign domination in Italy. With this purpose he entered the League of Cambrai (1508) with the Emperor Maximilian and Louis XII. of France against Venice. On the submission of the republic he formed the Holy League, which included Venice, Spain, and England, and was directed against Louis XII. and his occupation of Naples. Eventually the pope's armies drove the French back over the Alps. With all his fierceness and unscrupulousness, Julius was an enlightened patron of arts and letters. See *Life* by Dumesnil (1873) and by Brosch (1878).

Julius III., GIOVANNI MARIA DEL MONTE (1487-1555), was elected pope in 1550. As a cardinal he had been one of the three papal legates who opened the Council of Trent. He favoured the Jesuits, freeing the order from many disqualifications; and sent Cardinal Pole to arrange with Mary of England the best means of bringing the English Church and kingdom once more within the pale of Rome. His character was marred by his aggrandizement of his own relatives, and by licentious living.

Jullander. See JALANDHAR.

Julus, or IULUS, a genus of millepedes, to which belongs the common *J. terrestris*, or wire-worm of gardeners.

July. See YEAR.

Junet, mining tn., Belgium, prov. Hainault, 3 m. by rail N. of Charleroi. Pop. (1900) 25,937.

Jumieges, ROBERT OF (fl. 1037-52), archbishop of Canterbury, was of Norman birth, and was abbot of Jumieges in 1037. He accompanied Edward the Confessor to England (1043), and was appointed to the see of London in 1044, and to the archbishopric of Canterbury in 1051. He drove Earl Godwin and his sons into

exile, but was forced by their return in 1052 to leave the country and take refuge at Jumieges in Normandy.

Jumieges, WILLIAM OF, a monk of Normandy, author of a Latin history of Normandy and its dukes down to 1071, which is included in the *Patrologia Cursus Completus* (Migne).

Junilla, tn., prov. Murcia, Spain, 14 m. S.W. of Yecla. It produces coarse wine, olives, and esparto. Pop. (1900) 16,446.

Jumna, or JAMUNA, riv. of India, the chief affluent of the Upper Ganges, has its source on the S. slopes of the W. Himalayas, at a height of 12,000 ft. Flowing S. it forms the boundary between Punjab and the United Provinces; then running S.E. through the United Provinces, joins the Ganges 3 m. below Allahabad. It supplies the waters for the irrigation works of the E. and the W. Jumna canals. The chief cities on its banks are Delhi, Agra, Ferozabad, Muttra, and Allahabad. It has a length of 860 m., and drains an area of 118,000 sq. m.

Jumping. See ATHLETIC SPORTS.



Jumping Hare.

Jumping Hare, or SPRING-HAAS, names applied in S. Africa to *Pedetes caffer*, a member of the Dipodidae or jerboa family. In size, colour, and the shape of the head and ears, the animal resembles the common hare; but the tail is as long as the body, and is thickly haired throughout. The fore limbs are shorter than the hind, but this is less marked than in most jerboas. There are five toes on the fore foot, and four on the hind. The animal inhabits both the plains and the mountains of S. Africa, and is especially common in Cape Colony. When feeding it goes on all fours, but if alarmed, attempts to escape by the leaping movements characteristic of the family.

Jumping Mouse (*Zapus hudsonianus*), an unspecialized member of the jerboa family (Dipodidae), found throughout the greater part of N. America. It is like a mouse, with long hind legs and a very long tail, and

has five complete toes on the hind foot. Like the other members of the family, it progresses, when alarmed, by a series of rapid leaps.



Jumping Mouse.

Junagarh, feudatory state in Kathiawar, Gujarat, India, with an area of 3,283 sq. m., and a population of half a million. Cotton and cereals are grown. The chief town, Junagarh, on the Rajputana railway, 45 m. N. of Veraval, is on the Arabian Sea. Its royal tombs and Buddhist caves are of special archaeological interest. Pop. (1901) 34,251.

Juncus, a genus of grasslike herbs, growing in boggy places. These are the true rushes, and are extensively used for making mats, especially in Japan. Among the best known British species are *J. conglomeratus*, the common rush, with cylindrical stems and crowded panicles of flowers below the tapered extremities of the stems; *J. effusus spiralis*, the soft rush, nearly as common as the preceding species—from which it may be distinguished by its branching and looser inflorescence; *J. glaucus*, the hard rush, also very common, differing from the two preceding species by having its stems furrowed (its inflorescence is a loose branching panicle); *J. squamosus*, the heath rush, with root leaves, rigid leafless stems, and flowers blotched with yellow and white; *J. acutiflorus*, with cylindrical leaves borne on the stems, and with terminal panicles of flowers; and *J. compressus*, with grooved flat leaves borne on the stem. The only species worth cultivating is the Japanese *J. latevirens*, which bears tufts of bright green leaves about three feet high, and is easily grown in boggy ground.

June. See YEAR.

Juneau, mining settlement in S.E. Alaska, U.S.A., 80 m. S. by E. of Skagway, on Gastineau Channel. Pop. (1900) 1,864.

Jung, SIR BAHADUR (1816-77), prime minister to the maharajah of Nepal from 1846. Having expelled from the country the king and queen—the former incapable, the latter vindictive—he continued to hold the reins of government under their successor. His favourable attitude towards England was recognized by the bestowal of a knighthood.

Jung, JOHANN. See STILLING.
Jung, SIR SALAR. See SALAR JUNG.

Jungbunzlau, tn., Bohemia, Austria, 45 m. by rail N.E. of Prague. It was in the 16th century the seat, with a famous school, of the Moravian Brethren.

ing over the ground. The fructification consists of stalked capsules, which split into four valves, and discharge spores.

Jungfrau, Alpine peak, the third in height (13,669 ft.) among the Bernese Oberland peaks; owes its name (found as early as



Species of *Juncus*.

1. *Juncus acutiflorus*. 2. *J. squamosus*. 3. *J. glaucus*. 4. *J. conglomeratus*. 5. *J. compressus*. 6. *J. effusus spiralis*.

It manufactures cottons, woollens, sugar, beer, etc. Pop. (1900) 13,479.

Jungermannia, a genus of cryptogamic plants belonging to the order Jungermanniaceae, a subdivision of the class Hepaticae or liverworts. The plants are all inhabitants of damp places, creep-

1577) to the legend that no one could defile the snows of the 'virgin' peak; but it was ascended in 1811 by J. R. and H. Meyer. The usual starting-point is the Concordia Inn (9,436 ft.) above the Great Aletsch glacier to the E. of the peak, which can be thence gained in six hours

or less, without difficulty or danger for those used to mountain climbing. It can also be attained from Grindelwald, Lauterbrunnen, and the Little Scheidegg. A railway has been built from the Little Scheidegg up to the Eiger glacier. See Th. Wundt's well-illustrated monograph (1897).

Jungle, or JANGAL, literally 'waste,' is now applied to land covered with dense, luxuriant vegetation, such as long grass or undergrowth. It has also been used to signify the dense inter-tropical forest, also known as wet jungle.



The Jungfrau, from Interlaken.

Jungle-fowl, a general name for the members of the genus *Gallus*. The red jungle-fowl, *G. ferrugineus*, is the origin of the domesticated breeds of poultry. It inhabits India, Farther India, Sumatra, the Philippines, Celebes, and Timor, and strongly resembles the 'black-breasted game' variety of domesticated birds, with its fine orange or purplish-red upper surface, and greenish-black wings, tail, and under surface. Though excessively pugnacious in the wild state, polygamy is stated to be then rare. Three other species of jungle-fowl are known—the gray jungle-fowl of S., Central, and W. India

(*G. Sonnerati*), *G. Lafayetii* of Ceylon, and *G. varius* of Java, Lombok, and Flores; but all these are stated to be sterile when mated with the common fowl. See POULTRY FARMING.

Junia Gens, the Junian clan of ancient Rome. To it belonged Lucius Junius Brutus, who expelled the kings, and the famous Brutus who murdered Cæsar.

Juniper (*Juniperus*), a genus of hardy, evergreen, coniferous trees, with inconspicuous, dioecious flowers—the male in scaly catkins, the female in small globose cones—scale-like or needle-like leaves, and with berry-like fruit. The

parts of rectified spirit. Other species are *J. virginica*, the so-called red cedar, from the colour



Jungle-fowl.

of its heart-wood, a very handsome American tree, with erect trunk, the timber of which is used in manufacture; *J. Sabina*, the common savin, a dwarf procumbent shrub with a disagreeable odour when bruised; the tops of the twigs are occasionally used in pharmacy, oil of savin being reputed to have ebolic properties; *J. S. tamariscifolia*, a graceful variety of the last species; *J. drupacea*, a very beautiful small Syrian tree; and *J. excelsa*, which is not hardy in all parts of Britain. Propagation of any of the species may be effected by seed or cuttings. They flourish in open situations, and are not very particular as to soil.



Common Juniper.

1, Juniper, with fruit; 2, with male flowers; 3, male catkin; 4, anthers; 5, ripe fruit; 6, section.

common juniper, *J. communis*, is a native of N. Europe, including Great Britain. It is an evergreen shrub, with three sharp linear leaves in each whorl. When bruised, both stems and leaves yield the characteristic aromatic odour. The fruits of the common juniper are used in the making of hollands and other varieties of gin, and also in medicine, an oil being distilled from them which has a warm, aromatic taste and the characteristic odour of juniper. It is a strong diuretic, and gives to the urine a scent as of violets. Spirit of juniper is a mixture of one part of the oil with forty-nine

Junius, LETTERS OF. On Nov. 21, 1768, Junius's first letter appeared in Woodfall's *Public Advertiser*, the last on Jan. 21, 1772, in which year the letters were reproduced in two volumes. George Woodfall compiled an edition containing 113 extra letters

in 1812. Many were not by Junius; others by him are excluded. Woodfall did not know Junius, but he affirmed that he was neither Boyd nor Francis, who had contributed to his paper. With the signature 'Britannicus,' Francis defended Mansfield and the king against the attacks of Junius. In 1813, Taylor wrote that Dr. Francis and his son were joint-authors of the letters, and, in 1816, that Francis was the sole author. Francis emphatically denied the authorship. 'Crito' wrote to George Woodfall in 1821, saying that he possessed the most of Junius's manuscripts, and

was not he. In Francis's presence, Lord Grenville said that he knew the man, and that he would never tell. Junius had written three letters to George Grenville, and declared himself an attached follower. He wrote in like manner to Chatham. A pamphlet appeared two months after his letters were collected, with the title, *Poems Compiled by Junius*. It was noticed in the *Gentleman's Magazine* for May 1772. A copy has not been found in any public library. Junius could write verses. On March 24, 1758, he sent some lines entitled *Harry and Nan*, which Woodfall did not print, but of

Practically Investigated (1873); Brockhaus's *De Briefe des Junius*; and Francis's *Junius Revealed by his Surviving Grandson* (1894).

Junk, the name of the native Chinese vessel. It is a clumsy craft, with very high forecastle and poop, and pole masts carrying square sails of matting, and is slow and awkward to handle. Junks are often of large size, their tonnage sometimes reaching 1,000 tons.

Junker, WILHELM JOHANN (1840-92), African explorer, was born at Moscow, of German parents. The work of his life, African exploration, began in October 1875, and continued, with little intermission, until December 1886. The chief scene of his discoveries was the region stretching between the upper waters of the Nile and the Wellé. In addition to the great services which he rendered to geography, he also made valuable contributions to the sciences of ethnology and natural history. The revolt of the Mahdi in the spring of 1883 obliged Dr. Junker to withdraw towards the White Nile, where he joined Emin Pasha at Lado. In January 1887 he arrived at Zanzibar, and returned to Europe. The results of his travels were achieved 'without any show of force, and without a single violent death.' He wrote *Reisen in Afrika* (1889-91; Eng. trans. 1890-92). See Hevesi's *Wilhelm Junker* (1896).

Junnar, fortified tn., in Poona dist., Bombay, India, 48 m. N. of Poona. Pop. (1901) 9,675.

Juno, the third asteroid, discovered by Harding at Lilienthal, Sept. 2, 1804. It has a diameter of 120 m. (Barnard), and an albedo of 0.45. Its orbit, traversed in a period of 1,592 days, has a mean radius of 248 million miles, an eccentricity of 0.26, and is inclined 13° to the plane of the ecliptic.

Juno, the chief goddess of ancient Rome, was identified with the Greek Hera. As a Roman goddess Juno is the counterpart of Jupiter; thus she was regarded as the queen of heaven. She was also the especial protectress of the female sex, and was worshipped under a great variety of epithets—*Virginalis*, goddess of maidens; *Matronalis*, of matrons; *Natalis*, of the birthday (women offered sacrifices to Juno on their birthdays); *Pronuba* and *Juga* or *Jugalis*, as watching over marriage; *Lucina*, as presiding over childbirth; and in general as *Opigena* or *Sospita*, giving help and safety. She also was the guardian of the finances of the state; and as Juno Moneta had a temple which contained the mint at Rome. See HERA and JUPITER.



Chinese Junk, for Cargo and Passengers, Swatow.

used a seal, which Junius had done. The discoverer of 'Crito' will probably unmask Junius. His last authentic letter, after 1772, appeared in 1774. Lord Camden wrote of it to Garrick that 'Junius has given Mansfield another stab in the back in the *Morning Chronicle*.' A second was not published by William Woodfall, the editor. The Marquess of Lansdowne told Sir Richard Phillips that he knew Junius, and promised to end the controversy by writing a pamphlet; but he died without having done so. Pitt assured Lord Aberdeen of his personal knowledge of Junius, and that Francis

which he kept the manuscript. He did print others entitled *The Titans*, which were nearly as coarse. George Woodfall's conclusion is still as apposite as it was before his death in 1844. The one thing wanting is not supposition as to the personality of Junius, but 'proof through facts which are indisputable.' His manuscripts are in the British Museum. See Coventry's *Critical Inquiry into the Letters of Junius* (1825); Jacques's *History of Junius and his Works* (1843); Britton's *The Authorship of the Letters of Junius Elucidated* (1848); Taylor's *Junius Identified* (1816); *The Handwriting of Junius*

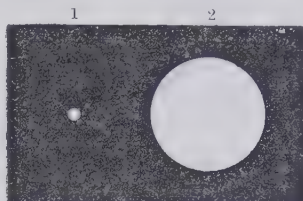
Junot, ANDOCHE, DUC D'ABRANTES (1771-1813), French general, born at Bussy-le-Grand (Côte d'Or); served under Napoleon in Italy, subsequently accompanying him to Egypt (1798). In 1804 he became ambassador to Portugal, but left Lisbon to join Napoleon in Germany. Placed in command of an army for the invasion of Portugal (1807), his brilliant manoeuvres, culminating in a successful dash upon Lisbon, won for him the governorship of Portugal, and the title of Duc d'Abrantes; but after a time he was forced by Wellington to leave the country. Junot was appointed governor of Illyria, but took part in the invasion of Russia. He ended his life in a fit of insanity.

Junot, LAURETTE DE SAINT-MARTIN-PERMON, DUCHESSE D'ABRANTES (1784-1838), wife of the above, distinguished herself by her social brilliance and remarkable extravagance. As ambassador to Lisbon, and during the Spanish campaign of 1807, she entertained with splendour and success, while in Paris her house was the centre of a cultured and distinguished circle. She published *Mémoires* (1831-35), which became widely known. See Turquan's *La Générale Junot, Duchesse d'Abrantes* (1901).

Junta, the name given in Spain to any body of men united together for administrative or political purposes, and may be either official or a spontaneous and unofficial gathering. A capital instance is the famous junta of 1808, elected to carry out the defence of the country against Napoleon. The word, corrupted into *junto*, and always used with a tinge of contempt and disapproval, is found in English history—e.g. the Whig queen under William III. and Queen Anne.

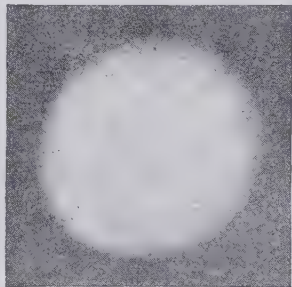
Jupiter, the chief god of ancient Rome. He was the son of Saturn and Rhea, and brother and husband of Juno. The first syllable of his name corresponds with the Greek Zeus and the Sanskrit Dyaus ('light'), and Jupiter thus means 'the light-father'; hence he was worshipped as the god of rain, storms, thunder, and lightning, under the titles of Pluvius, Tonans, Fulgurator, and Fulminator. As the greatest of the gods he was known as Optimus Maximus—'best and greatest.' He was held to be the special guardian of Rome, and as such bore the titles Imperator, Victor, Invictus, Stator, Triumphator, and was solemnly invoked by the consuls on entering office; while the triumph of a successful general was really a special thanksgiving to him. As Jupiter Capitolinus he presided over the great games at Rome; and as Latiaris,

over the Latin festival. He ordered the course of events, and revealed the future by omens and portents, and so was worshipped as Prodigialis; and as the supreme upholder of justice, punished oath-breakers, who were cast down from the Tarpeian rock. His worship was under the especial care of the Flamen Dialis, the highest in rank of all the *flamines*.



Relative Sizes of the Earth (1) and Jupiter (2).

Jupiter, the largest planet in the solar system, has a mean diameter of 86,500 miles. Its mass is 316, its volume 1,300 times that of the earth. Gravity exerts at its surface $2\frac{1}{2}$ its power upon the earth; hence the specific lightness of the globe suggests that it is greatly distended by internal heat. The disc is exceedingly brilliant (albedo = 0.62) but not appreciably self-luminous. Its diversification with dusky equatorial belts and with spots various in aspect and durability intimates that the disc represents a cloud-envelope. Its most remarkable feature is a red



Telescopic View of Jupiter.

patch measuring 30,000 by 7,000 miles, which became conspicuous in 1879, and is still faintly visible. Some of the markings on Jupiter rotate in about 9 h. 50 m., others in 9 h. 55 m., those near the equator giving, on the whole, the shortest periods. The axis of rotation deviates from perpendicularity to the orbital plane by only 3° . The planet revolves round the sun in a period of 11.86 years, at a mean distance of 483 million miles, in an ellipse of which the eccentricity is 0.04825, and the inclination to the plane of the

ecliptic $1^\circ 19'$. When in opposition about October 6, being then at perihelion, it is 42 million miles nearer to the earth than at aphelion oppositions in April, and shines with five or six times the lustre of Sirius.

Jupiter has seven satellites—the four outer ones discovered by Galileo in January 1610, an inner minute one by Barnard at Lick in September 1892, and two faint exterior attendants by Perrine in 1904-5. The five interior bodies revolve in orbits very slightly eccentric and nearly coincident with the plane of the planet's equator, at distances from its centre of severally 112,500, 261,000, 415,000, 664,000, and 1,167,000 miles, the corresponding periods being 11 h. 57 m., 1 d. 18 h. 27 m., 3 d. 13 h. 14 m., 7 d. 3 h. 42 m., and 16 d. 16 h. 32 m. Their rotations are probably or certainly isochronous with their revolutions. Their transits across Jupiter's disc are attended by curious phenomena of light and shade. The dynamical relations of the system are such as to preclude its members from being all together on the same side of the primary; but it occasionally happens that all are either occulted, eclipsed, or in transit simultaneously, when Jupiter is seen moonless. His 'comet-family' consists of thirty-two known members, probably introduced into the solar system by his influence.

Jupiter, a British first-class battleship (14,900 tons) launched in 1895. This ship-name was introduced into the navy in 1778.

Jupiter Ammon. See AMMON.
Jura, isl., Inner Hebrides, Argyllshire, Scotland, separated from Islay by the Sound of Islay, from the mainland by the Sound of Jura, and from Scarba by the dangerous strait of Corrieveikin. Length, 28 m.; width, from $\frac{1}{2}$ to $8\frac{1}{2}$ m. The area is 143 sq. m. On the w. side it is rugged, and on the e. is clothed with vegetation. The Paps of Jura reach 2,571 ft., 2,477 ft., and 2,412 ft. respectively. Most of the island consists of deer forests. Pop. (1901) 560.

Jura, dep. (area 1,951 sq. m.), France, bounded on the E. by Switzerland, is divided into three regions—(1) a mountainous region in the S. and E.; (2) the vine region in the N.; and (3) a small plain to the W. The drainage is mainly S.W. to the Rhone by means of the Doubs and the Ain. There are large forests. Grain and potatoes are cultivated, the vine flourishes, cattle are pastured in the mountain region, and Gruyère cheese is a noted manufacture. Rock salt is mined. Watchmaking and turning are the chief industries. Cap. Lons-le-Saunier. Pop. (1901) 261,288.



The chief God and Goddess of Ancient Rome—Jupiter (in the Vatican Gallery) and Juno (in the Villa Ludovici).

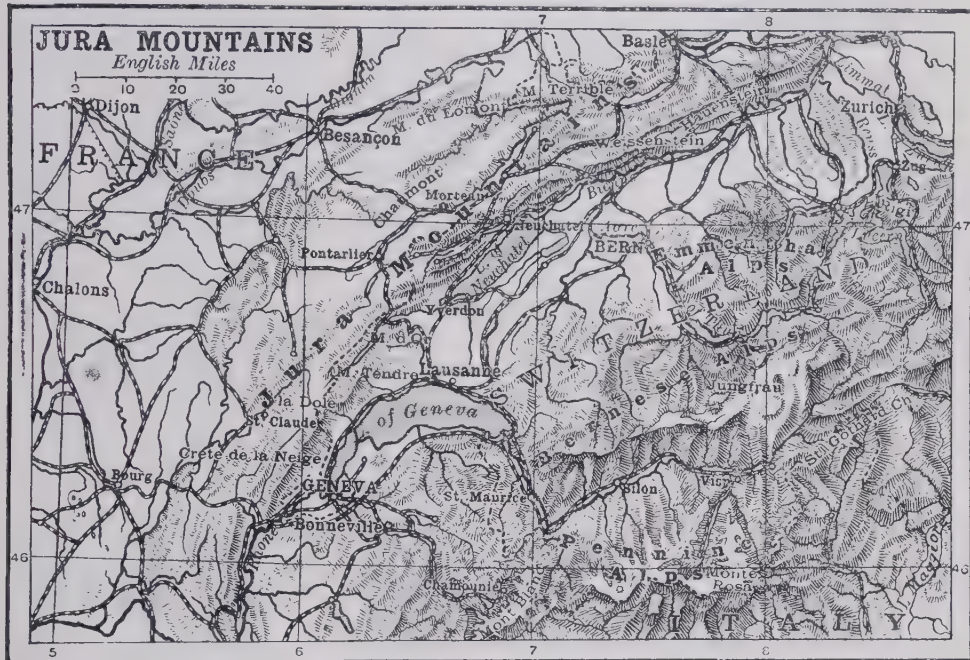
Jura Mountains, THE, stretch in a curve for about 190 m. in a north-easterly direction through the French departments of Ain, Jura, and Doubs, and the Swiss cantons of Vaud, Neuchâtel, and Bern. It is made up of seven parallel chains, with an average height of from 2,000 to 2,500 ft., and is composed, especially on the French side, of Jurassic limestone. The chief peaks are the Crêt de la Neige (5,655 ft.), Colombier de Gex (5,548 ft.), Mont Tendre (5,519 ft.), and La Dôle (5,505 ft.). Caves are frequent, and the rivers often flow underground for considerable distances.

sion is subdivided into the Lias and the Oolites thus:—

UPPER OOLITES.	Purbeck Beds: fresh-water clays, limestones, etc.
	Portland Beds: marine oolitic limestones, etc.
	Kimmeridge Clays: marine clays and black shales.
MIDDLE OOLITES.	Corallian: marine limestones, etc.
	Oxfordian: marine clays and limestones.
	Great or Bath Oolite: marine oolitic limestone.
LOWER OOLITES.	This comprises the following groups: Inferior Oolite, Stonesfield Slate, Great Oolite, Forest Marble, Cornbrash.

their appearance, showing that a river or series of rivers debouched into the sea near that locality (Northampton sands).

In Germany the Jurassic is divided into three series—the Lias, the Dogger, and the Malm (known also as the Black Jura, the Brown Jura, and the White Jura). Rocks of this system cover a wide spread in Silesia, Franconia, and North-west Germany. In France the subdivisions of the Jurassic are very similar to those adopted in England, and a tract of these rocks surrounds the Paris basin. In N. America Jurassic strata are well represented in Colorado and



Jurassic System, the division of geological strata following the Triassic and immediately preceding the Cretaceous. The system derives its name from the Jura Mountains in Switzerland, which are largely built up of rocks of this group. A broad belt extends from Lyme Regis in Dorset to north of Scarborough in Yorkshire. It consists of alternating limestones and clays, the limestones forming prominent ridges and escarpments, while the clays between are excavated into low-lying, well-watered, fertile valleys. The limestone hills are known as wolds (or moors in Yorkshire), and have a thin soil; the clays underlie some of the richest dairy-farming land in England. The Jurassic suc-

LIAS.	Upper Lias: clays and shales, marine.
	Middle Lias: marine limestone (marlstone) and clays.
	Lower Lias: marine clays with some limestones.

It will be seen that all these beds are marine, with the exception of the topmost. The limestones, in particular, are very rich in fossils, many of them being banks of shells and corals. They indicate the existence of clear, warm seas of moderate depth over the south and east of England, with bays and sounds extending up to Scotland. The succession given above is that observed in the west of England, but towards Lincolnshire and Yorkshire estuarine deposits make

the West; and in Australia, India, S. Africa, and S. America the Jurassic is largely developed.

The association of animal types is that which is characteristic of the Mesozoic epochs. Ammonites abounded in the warm sea waters, there being a rapid succession of genera and species of this group. Belemnites also swarmed in those seas. Great banks of coral limestone were built up in England and in France. Molluscs of all kinds are abundantly preserved in the limestones. Echinoids, star-fishes, crustaceans, crinoids, and brachiopods, though perhaps less important, were also numerous. Among the plants cycads seem to have predominated. The most important are Mantellia, otozamites, bennett-

ites, and zamites. Many varieties of ferns and of gymnosperms are also known from the Jurassic rocks. The teeth and jaws of a few mammals—allied to marsupials and monotremes—have been found in the Oolites (Stonesfield slate) and in the Purbeck. They were carnivorous or insectivorous. This was essentially the age of reptiles, and they attained a great size and a high degree of specialization. Some were like huge whales or porpoises (Ichthyosaurus); others were gigantic land animals of herbivorous habits (Atlantosaurus, Cetosaurus, and the dinosaurs); others were endowed with the power of flight (ptero-dactyls). Tortoises and crocodiles are found also in the Jurassic, but the snakes first made their appearance at a later period.

From the Jurassic rocks of England many useful products are obtained. The fine freestones of Portland and of Bath are extensively used as building-stones. Many of the clays are employed in the manufacture of bricks. The septarian nodules are made into cement, and the shelly limestones of the Purbeck have been used as ornamental marbles. The Cleveland ironstones, largely mined on the north-east of England, are Jurassic; and Oolitic coal is worked at Brora in Sutherlandshire. Fuller's earth, alum, and jet are among the materials derived from this formation. On the continent of Europe they sometimes contain petroleum, and in many places (e.g. Bohemia, India) valuable deposits of brown coal.

Jurien de la Gravière, JEAN PIERRE EDMOND (1812-92), French admiral, born at Brest; chiefly noted as the author of *Guerres Maritimes* (8th ed. 1883); *La Marine d'Aujourd'hui* (1872); *Les Marines du XV^e et XVI^e Siècle* (1878); *La Marine des Anciens* (1880); *Doria et Barberousse* (1886); *Les Origines de la Marine et la Tactique Naturelle* (1892).

Jurieu, PIERRE (1637-1713), French Protestant theologian and controversialist, born at Mer in Loir-et-Cher; became professor of theology at Sedan (1674). For the concluding part of his life he laboured as pastor of the Walloon church at Rotterdam. His polemics with Arnauld, Fénelon, Bossuet, Bayle, and others in defence of Protestantism were able, but often aggressively fierce. He was a convinced theorist on the prophecies of the Apocalypse. Among his works are *Lettres Pastorales Adressées aux Fidèles de France* (1686-7), *Hist. du Calvinisme* (1682), and *Hist. Critique des Dogmes et des Cultes* (1704-5). See Maguin's *Notice sur Jurieu* (1804).

Juriev. See YURYEV.

Jurisdiction, the authority of a court or judge. The superior courts are presumed to have jurisdiction, except when it is shown that they have not; but inferior courts are never presumed to have any jurisdiction, except what they can be expressly shown to have. The jurisdiction of a court is limited either as to the matters it may hear and determine, or as to the territorial limits within which its authority is confined. The jurisdiction may be exclusive, or concurrent, or auxiliary. Statutory powers have been conferred upon the British courts to make rules for the service of process in certain cases out of the jurisdiction.

Jurisprudence is the science of law. It classifies and explains the sources, the objects, and the divisions of law, not from the point of view of any particular legislative system, but from a consideration of the principles which govern all law. Law deals with rights either of the state or of private persons or corporations. The person who enjoys a right is called the person of inheritance; the person against whom it may be enforced is called the person of incidence. The other elements of a right are the object over which the right is exercised, and the acts or forbearances which the person of inheritance is entitled to exact. Persons may be divided into normal and abnormal. The latter class includes infants, slaves, or lunatics, whose rights are limited. When both the person of inheritance and the person of incidence are states, the law is international; when one of them is a state, the law is public; when both are private persons, the law is called private. Substantive law is the law which defines rights; adjective law is that which enforces rights—e.g. procedure. Rights are called *in rem* when they are available against all the world—e.g. freedom, the society of one's family, the right to one's good name, the right to be unmolested in one's occupation, the right to one's own property. Rights *in personam* are available against individuals. They may arise from contract, from the exercise of public office, from the relation of husband and wife or parent and child, from the relationship between trustee and beneficiary, or from salvage. Rights may also be classified as antecedent (e.g. the right to rent) or remedial (e.g. the right of distress if rent is not paid). Public law may be divided into (a) constitutional, (b) administrative, (c) criminal, (d) adjective criminal, (e) the law of the state as a person, and (f) the adjective law of the

state as a person. See T. E. Holland's *The Elements of Jurisprudence* (9th ed. 1900), and Austin's *Jurisprudence* (5th ed. 1885).

Jurors. See JURY.

Jury. A jury is a body of men sworn to give a true verdict according to the evidence laid before them. In England no man can be tried on indictment until a true bill has been found by a grand jury. He is then tried before a petty jury, which generally, and always in cases of felony, is a common jury, but in some cases of misdemeanour may be a special jury. In civil actions the jury is either a common or a special jury, at the option of the parties. The grand jury has a different origin and function from a petty jury. It has only to do with criminal indictments, and, historically, its origin is to be found in the twelve theanes or freeholders of each hundred who in Anglo-Saxon times presented or accused persons who by common fame were guilty of crime. The petty jury which tries a criminal originally consisted of men who knew the facts and swore to the guilt or innocence of the accused as a matter of their own knowledge. In less primitive times, and in a more complex state of society, the jury did not know the facts, but simply considered the presumptions raised by the presentment, and gave their verdict accordingly. Finally, and by slow degrees, the rules of evidence were framed; witnesses were called, at first for the crown only, and afterwards for the defence as well; and the jury assumed its present function of hearing the witnesses and finding a verdict of guilty or not guilty as an inference of fact drawn from the evidence given. In civil cases, the origin of the jury is probably to be found in the inquest, introduced into England by the Norman kings, and at first employed for the ascertainment and discovery of royal rights and property, but gradually extended to other inquiries as a valuable method of getting at the truth. At every assize and session of the peace a grand jury is sworn, and is charged by the judge; and the jurors then consider the bills of indictment submitted to them, hear what evidence they think necessary, and if they consider there is a *prima facie* case they find a true bill. If they think the charge is unfounded, they throw out or 'ignore' the bill. A grand jury may also (though now they very rarely do) make a presentment or accusation of their own knowledge against some person named. The judge puts the presentment into the form of an in-

dictment, and the ordinary procedure is then followed. A grand jury may also make a presentment of their opinion in favour of some change in the law, or as to the existence of nuisances or grievances in their district. Grand jurors at quarter sessions must have the same qualification as common jurors. At assizes it is said they need no property qualification, but it is usual to summon county justices.

Every man between twenty-one and sixty is liable to serve as a common jurymen if he has the necessary property qualification, and is not exempted or disqualified specially. The property qualification consists in having £10 clear from real estate or £20 from leaseholds, or being rated on an annual value of £30 in Middlesex and £20 in other counties. At borough sessions all male burgesses are qualified, and that practically includes all male rate-paying residents. Persons attainted of treason or felony, or convicted of infamous crime, are disqualified; and many persons are specially exempted, including peers, members of Parliament, practising barristers and solicitors, physicians, surgeons, and officers of the army and navy on full pay. Jury lists are made up by the overseers in the parishes, and settled by the justices in each division of a county. From these lists the under-sheriff makes the jury book for the year, and summons a sufficient number of jurymen when required to do so by a court. Jurymen who do not attend when summoned may be fined. A common jurymen is entitled to 5s. for a view, but to no other remuneration. In the High Court, in a civil action he is usually given 1s., and on circuit 1s. 6d. In a criminal case no fee is paid. Every person whose name is in the jurors' book, and who is entitled to be called 'Esquire,' or who is of higher degree, or a banker or merchant, or an occupier of a private dwelling-house rated on a value of £100 in large towns and £50 elsewhere, or of premises other than a farm of the annual value of £100, or a farm of £300, is qualified and liable to serve as a special jurymen. He is entitled to such remuneration as the judge thinks fit, not exceeding one guinea for a case. The party who applies for a special jury has to pay the cost. Both in civil and in criminal proceedings either party may challenge the array—i.e. the whole of the jurymen impanelled—on the ground of the partiality, fraud, or wilful misconduct of the sheriff or other officer who returned them. Either party may challenge any particular juror for cause—i.e. as not qualified, or not impartial.

In criminal cases the accused may also challenge peremptorily—i.e. without giving any reason—thirty-five persons in a case of treason, and twenty in a case of felony.

In the High Court, all matters assigned to the Chancery Division are tried by a judge alone, and in many other cases the court may order a cause to be tried without a jury; but in actions of slander, libel, false imprisonment, malicious prosecution, seduction, or breach of promise of marriage, either party may claim a jury; and in the Divorce Court, if the petition claims damages, there must be a jury. In criminal cases, and in actions in the High Court, the number of the jury is twelve, and the verdict must be unanimous. But in a civil action the parties may agree to accept the verdict of a majority. A coroner's jury consists of not less than twelve and not more than twenty-three, and a verdict of a majority, not being less than twelve, is sufficient. A county court jury consists of five. Aliens who have been ten years domiciled in England are liable to serve on juries; but the accused, if an alien, is no longer entitled, as formerly, to have half the jury aliens. Juries are allowed to separate and return to their homes at the end of each day's proceedings, except in cases of murder, treason, or treason felony; and the judge may allow them a fire when out of court, and reasonable refreshment at their own expense. Women cannot serve on juries except when a jury of matrons is summoned to inquire as to pregnancy.

In Scotland, every man between twenty-one and sixty is liable to serve as a common juror if he is seized of lands or tenements of the yearly value of £5, or is worth £200 of personal property; and as a special juror if he pays less on £100 rent, or taxes on a house of £30 yearly rent, or is infest in lands or heritages in Scotland of the annual rent of £100, or is worth £1,000. The sheriffs make up the general and special jury books. In a criminal trial the jury consists of fifteen, composed of five special and ten common jurors. The verdict of a majority is enough. In civil actions, trial by jury, although it is said to have existed at one time, had died out, and it was reintroduced by statute in 1815 (55 Geo. 3, c. 42). The Evidence Act, 1866, provides that, with the consent of the parties, or on special cause shown, the lord ordinary may dispense with a jury in any case before him; but in practice, actions of damages for accident, defamation, or

nuisance, actions as to public rights of way, and actions to reduce deeds on the ground of the incapacity of the maker, or of facility and circumvention, are generally tried with a jury.

In Ireland the jury system is practically the same as in England, though it is governed by special statutes, and in recent years it has been restricted on political grounds, at least in districts proclaimed under the Crimes Prevention Acts. The grand jury, however, had far more extensive powers and duties than in England, as it was the authority which exercised most of the administrative and fiscal business of the county, till these powers were transferred to the county councils created by the Local Government Act, 1898.

Trial by jury, very much as in England, exists in the United States and in most British colonies; and, in criminal cases at any rate, it has been introduced into France and many other European countries. See Forsyth's *Hist. of Trial by Jury* (1852), Stubbs's *Constitutional Hist. of England* (6th ed. 1887-8), Pollock and Maitland's *Hist. of English Law* (2nd ed. 1898), Taylor on *Evidence* (9th ed. 1895), and Holland's *Jurymen's Handbook* (1891).

Jus Devolutum, the right of the church to appoint a minister to a vacant parish if the patron neglects to do so within the time prescribed by law.

Jus Gentium, a term of Roman law, denoting that part of the Roman law which all civilized nations recognized as binding. It is sometimes confused with international law.

Jus Mariti. See HUSBAND AND WIFE.

Jus Primæ Noctis, a peculiar prerogative claimed by autocrats and hierophants in certain races and castes, under which law the maidens of the community are forbidden to yield up their virginity to any but the king or leader. In the quasi-gypsy or 'canting' gangs that formerly roamed over England, says Francis Grose, quoting authorities of the 17th century, the *jus primæ noctis* was one of the unquestioned privileges of the chief. Then there are cases, as among the Bhattias of Western India (referred to by Mr. Staniland Wake), where an inferior tribe willingly accords this privilege to men of a caste esteemed by them as almost divine. In Cambodia, according to a Chinese account cited by Rémusat, the ceremony of *chin-tan*, or *défloration légale et religieuse*, is performed by a priest, at the request of the girl's parents; and without this ceremony no girl is eligible

for marriage. Blackstone points out that several writers regard this custom, when practised in Europe, as the cause of the law of *Jüngsten-Recht*, known in England as *borough English*, which barred the eldest son from succession to his putative father's real estate. Many modern writers assert that the *jus prime noctis* never existed in Europe; but the evidence in its favour is widespread and emphatic. It has been assumed that the fine paid by vassals on the occasion of their daughters' marriage was in reality a commutation for this *droit du seigneur*. See Grose's *Dictionary of the Vulgar Tongue* (1785), s.v. 'Dells' and 'Upright Man'; K. J. L. Schmidt's *Jus Prime Noctis* (1881); Wilutsky's *Borgeschichte des Rechts* (1902-3); and De Jubainville's *La Famille Celtique* (1905).

Jus Relictæ, in Scots law, the right of a wife on the death of her husband to a certain portion of his movable property. If there are children, she is entitled to one-third; and if there are no children, to a half. The right cannot be defeated by any testamentary deed, but the wife may renounce her right by an antenuptial marriage contract.

Jusserand, JEAN ADRIEN ANTOINE (1855), French author and diplomatist, born at Lyons; entered the Foreign Office (1878), and was appointed French ambassador at Washington (1902). He has studied and written, especially on subjects connected with England. Chief works: *Théâtre en Angleterre jusqu'à Shakespeare* (1877); *English Wayfaring Life in the Time of Shakespeare* (trans., 4th ed. 1892); *A Literary History of the English People* (trans. 1895); *The English Novel in the Time of Shakespeare* (trans. 1890); and *The Romance of a King's* [James I.'s] *Life* (1896).

Jussieu, DE, a French family, chiefly of botanists. ANTOINE (1686-1758), born at Lyons, became professor of botany in Paris, in succession to Tournefort, whose *Institutiones Rei Herbarie* he edited (1719).—BERNARD (1699-1777), brother of the foregoing, also born at Lyons, possessed a rare knowledge of botany, and edited Tournefort's *Histoire des Plantes qui naissent dans les Environs de Paris* (1725). He arranged the plants in the Trianon garden at Versailles under the system of classification afterwards developed by his nephew, Antoine Laurent, in his *Genera Plantarum* (1789).—JOSEPH (1704-79), brother of the two foregoing, spent a great part of his life in S. America, from whence he sent the first seeds of *Heliotropium peruvianum* to Europe.—ANTOINE LAURENT

(1748-1836) is chiefly remembered for his *Genera plantarum secundum ordines naturales disposita* (1789), on which the present classification was constructed. He was professor of botany in Paris (1770-85).—ADRIEN LAURENT HENRI (1797-1853) published important memoirs on the Rutaceæ, Meliaceæ, and Malpighiaceæ; also a widely-used *Cours Élémentaire de la Botanique* (12th ed. 1884).—LAURENT PIERRE (1792-1866), French educational writer and moralist, nephew of Antoine Laurent. His most popular work was *Simon de Nantua* (1818), which ran through more than thirty editions, and was translated into nearly a dozen languages.

Juste, THÉODORE (1818-88), Belgian historian, was born at Brussels; appointed curator of the museum of antiquities there (1859), where he became professor of history at the military academy (1870). His works deal chiefly with the history of the Low Countries—*Histoire de Belgique* (new ed. 1894); *Histoire de la Révolution Belge de 1790* (2nd ed. 1885); *Charles v. et Marguerite d'Autriche, 1477-1521* (1858); *Histoire de la Révolution des Pays-Bas sous Philippe II.* (new ed. 1884-5); *Guillaume le Taciturne* (1873); and *Les Fondateurs de la Monarchie Belge* (1865-81).

Justice, MR., LORD, LORD CHIEF, and HIGH COURT OF. See JUDGE and SUPREME COURT of JUDICATURE.

Justice-General and Justice-Clerk. See COURT of SESSION.

Justice of the Peace. In England this title was first conferred by an act of 1360 (34 Ed. III. c. 1), and the commission of the peace in counties became a permanent institution from about that time. The charters of many ancient boroughs created some or all of the aldermen, or other members of the corporation, justices *ex officio*; but chartered justices were all abolished by the Municipal Corporations Act, 1835, except in the case of the city of London. At the present day justices are appointed by commission from the king, but in practice they are selected by the lord chancellor, who generally acts on the recommendation of the lord lieutenants in the case of county justices, and sometimes receives representations from the council of a borough in the case of borough justices. A county justice has jurisdiction in his county, and in all boroughs in that county except those which have a separate court of quarter sessions and a clause in their charter excluding the jurisdiction of the county justices. His qualification, unless he is a peer, judge, privy councillor, or county court judge, is the possession of £100

a year from real estate, or from leaseholds of more than twenty-one years, or a reversion of £300 a year from leaseholds for lives, or the occupation for two years before his appointment of a dwelling house in the county assessed to the inhabited house duty at not less than £300 a year. A borough justice has jurisdiction only within his borough. He must reside within seven miles of, or occupy property in, the borough. Although the judicial jurisdiction of justices is limited to their county or borough, an affidavit may be sworn before a justice outside his jurisdiction. Justices must take the oath of allegiance and the judicial oath (Promissory Oaths Act, 1868). The chairman of a county council (Local Government Act, 1888), and of a district council, unless a woman (Local Government Act, 1894), is *ex officio* a county justice; and the mayor of a borough during the year of his office, and one year after if still qualified to be mayor, is *ex officio* a borough justice (Municipal Corporations Act, 1882). The mayor of a London borough is *ex officio* a justice for the county of London (London Government Act, 1899). A solicitor cannot be a justice for the county or county town in which he practises, nor a sheriff in his county; and bankrupts, and persons found guilty of corrupt practices at parliamentary or municipal elections, are disqualified. A number of acts which impose special duties upon justices—such as the Licensing Act (1872), the Coal Mines Regulation Act (1887), the Factory and Workshop Act (1901), and the Trades Unions Act (1871)—prohibit interested persons from acting as justices under them. No action can be brought against a justice for any act done within his jurisdiction, except on the ground of malice; nor for any act done outside his jurisdiction, unless it has been actually quashed; nor for any act which a justice has been ordered to do by a superior court. Most actions against a justice must be brought within six months. For hundreds of years the justices were practically the only administrative authority for miscellaneous purposes in the counties, and a large number of acts conferred upon them a great variety of powers and duties, but most of their administrative functions were transferred to the county councils created in 1888.

In Scotland justices were first appointed in the reign of James VI. (1587). The form of the commission is the same as in England. There is no property qualification. Sheriffs, the senior magistrate of any populous place, the convener of a county, the chair-

man of a district committee, and the chairman of a parish council, are all *ex officio* justices. The judicial and administrative powers and duties of justices are dealt with under SESSIONS OF THE PEACE, SPECIAL SESSIONS, and SUMMARY JURISDICTION; also METROPOLITAN POLICE COURTS, RECORDER, SMALL DEBT COURTS, and STIPENDIARY MAGISTRATES. See Archbold's *Quarter Sessions* (5th ed. 1898), Wigram's *Justices' Note Book* (7th ed. 1900).

Justiciary, HIGH COURT OF, the supreme criminal court in Scotland. The judges are the judges of the Court of Session, and the court sits in Edinburgh whenever necessary, on the requisition of the lord advocate. Sittings are also held in the circuit towns, but not unless there are cases for trial. In the west circuit there are six sittings a year at Glasgow, and two at Stirling and Inverary; in the north circuit, four at Perth, Dundee, and Aberdeen, and two at Inverness; and in the south circuit, two at Ayr, Dumfries, and Jedburgh. At most trials only one judge sits, but sometimes, in important cases, two or three. In exercising the appellate jurisdiction of the court three judges are a quorum. The court has the widest possible jurisdiction with regard to all offences against the general law, but on circuit prisoners are only tried for crimes committed within the area of the circuit. There is no appeal from the High Court of Justiciary, but appeals lie to it from inferior courts in criminal matters on questions of law.

Justifiable Homicide. See MANSLAUGHTER.

Justinian, FLAVIUS ANICIUS JUSTINIANUS (483-565), emperor of Constantinople and Rome. He was born at Tauresium in Illyria, his family being of Gothic extraction. Justinian's reign was marked by wars against the Persians, the Vandals in Africa, the East Goths in Italy, the West Goths in Spain, and the Bulgarians, who invaded Thrace. Thanks to the genius of Belisarius and Narses, Justinian's armies were on the whole so successful that at the end of his reign his empire included, in addition to Thrace, Macedonia, Greece, Asia Minor, Syria, Egypt, and generally the eastern half of the old Roman empire, Africa also, Italy, and part of Spain. Yet his policy to the barbarians threatening the empire, such as the Longobardi, Gepidæ, Avars, and Bulgarians—*viz.* of playing them off against each other—was so unsound that his successors found themselves unable to retain the huge territory he had conquered. His system of frontier defence,

which attempted to repel invasions by vast lines of forts and towers, subsidiary to greater fortresses, of itself showed the weakness of the empire. His administration is also remarkable for its fiscal severity. He showed the same severity in his dealings with Christian sectaries, Jews, and pagans. He spent large sums in building; the church of St. Sophia (now a mosque) at Constantinople was erected by him. Apart from his wars, the chief event of his reign was an extraordinary riot between the so-called Blue or orthodox Christian faction and the Green at Constantinople, in January 532, when the whole city became filled with fire and bloodshed; the church of St. Sophia, much of the palace, and a vast number of other buildings were burnt, and many thousands of people slain. These are the so-called 'Nika' riots. At length Belisarius led 3,000 veterans against the Green faction, who had fortified themselves in the Hippodrome: it was stormed, and 30,000 of the rioters were slain in one day.

The fame of Justinian, however, rests perhaps more on what he did for Roman law, in that he attempted to reduce to system all preceding Roman law. He appointed a commission of jurists, under the presidency of Tribonian, who compiled two great works—first, the *Justinianus Codex*, a collection of the imperial constitutions (529 A.D.); and secondly, the *Digesta* or *Pandectæ*, a compilation of all that was valuable in previous jurisprudence (529 A.D.). An elementary treatise, the *Institutiones*, was also published in 533. In later years he promulgated many corrections and reforms in works called *Novellæ Constitutiones*. These four works form the *Corpus Juris Civilis*, or 'Body of Civil Law,' of which there is a stereotyped edition (3 vols. 1888-95). See Moyle's ed. of *Institutiones* (with Eng. trans. 1896), *Digesta* (Eng. trans. Monro, 1904, etc.), Roby's *Introduction to the Study of Justinian's Digest* (1884), Diehl's *Justinien et la Civilisation Byzantine* (1901); and Holmes's *The Age of Justinian and Theodora* (1905).

Justinian II., surnamed RHINOTMETUS, was emperor of the East from 685 to 695 A.D., and again from 704 to 711. He succeeded his father, Constantine IV. (Pogonatus). The cruelty and severity of his rule caused his deposition in 695; but in 704 he was restored by a Bulgarian force, and reigned with greater tyranny than before, which led to a military revolt in which he was killed.

Justin Martyr, one of the earliest apologists of Christianity, was born of Greek parents at Flavia Neapolis in Samaria,

c. 100 A.D. Well schooled in the prevailing philosophies of his time, and at first largely dominated by Platonism and Stoicism, he eventually became a Christian, and the ability and zeal with which he defended Christianity and assailed paganism led at length to his martyrdom in Rome (c. 148 A.D.) under Antoninus Pius (or, according to Eusebius, *Hist. Eccles.* iv. 16, considerably later, under Marcus Aurelius). He wrote two apologies for the Christians, the first and larger of which is addressed to the emperor, the second being of the nature of an appendix. In these he pleads for a more humane treatment of Christians, and a reconsideration of their credentials. His *Dialogue with Trypho* seeks to maintain the claims of Christianity as against Judaism. Some of his writings are no longer extant—*e.g.* his treatises on *Hereses* and on the *Resurrection*—but this balance of loss has been traditionally redressed by the attribution to him of a *Speech to the Greeks* and an *Exhortation to the Greeks*, almost certainly not his. His presentation of Christianity as the perfect philosophy, while characteristic of his age, is open to obvious objections, and often brings him upon questionable ground. See works in Ante-Nicene Christian Library, and monographs by Semisch (trans. 1843), Engelhardt (1878), Aube (1874), Freppel (1886), and J. Kaye (1889); also *Life by Martin* (1890).

Justinus I., emperor of the East from 518 to 527 A.D., was probably of Gothic descent, and began life as a shepherd. He distinguished himself in war against the Isaurians and Persians, became commander of the imperial guards under the Emperor Anastasius, and when the latter died, Justinus secured his own election as emperor. His reign is memorable chiefly for his resignation of the appointment of consuls to Theodoric, king of the Goths (522); for a war with the Persians; and for the destruction of Antioch in 525 by fire and inundations. He was succeeded by his nephew, Justinian I.

Justinus II., emperor of the East from 565 to 578 A.D., was a nephew of Justinian, whom he succeeded. In his reign the Longobardi, or Lombards, deprived him, between 568 and 570, of the country now called Lombardy, and indeed of most of Italy. He also waged a disastrous war against Persia. From 574 A.D. Justinus's mental condition unfitted him for rule, which was carried on by his empress, Sophia. See Groh's *Geschichte des Oströmischen Kaisers Justin II.* (1889).

Jute is a fibre obtained from two species of *Corchorus* (natural order Tiliaceæ), *C. capsularis* and *C. olitorius*. Both species are indigenous in Bengal, where they have been cultivated from very remote times for economic purposes. Both are annuals, with yellow flowers, which flourish best on a loamy soil. *C. capsularis* is the larger plant of the two, and its fruit is more globular than that of *C. olitorius*, but for economic purposes there is no practical difference between the two. The latter has been cultivated extensively as a pot-herb, and is believed to be identical with the mallows mentioned in Job 30 : 4. Sowing takes place from mid-

rainfall. It is grown to a limited extent in Hankow in China, but attempts to naturalize it elsewhere have met with but poor success. For about twenty years (1870-90) continuous but unsuccessful efforts were made to grow it in the United States, especially in Texas, Louisiana, and Mississippi. Similar attempts in Egypt and Algeria also proved failures. Cultivation has been tried recently in French Guiana.

Jute was first introduced to the notice of British manufacturers in 1795, but was a long time in becoming popular. Attempts to use it for carpet manufacture were made at Abingdon about 1820, but it was not introduced at Dundee until more than ten years later. Its use at the latter place did not, however, become extensive until about 1850, since which date Dundee has been the chief centre of the industry of producing jute fabrics. The export of raw jute from India increased from an annual average of 39,642 cwt. in the ten years 1829-38 to an annual average of 11,228,634 cwt. in the ten years 1889-98, and to 13,535,522 cwt. in the year 1904.

The tendency during the last few years of the exports has not, on the whole, been in the direction of rapid increase. This is due partly to crop deficiencies, but partly also to increased manufacture in India itself. The recent growth in this direction is shown in the following table, compiled from official sources :—

extent, and get it into a suitable condition for the jute softener or mangle, into which it is now fed after being separated into large handfuls by women batchers. The jute softener is a machine of about sixty pairs of fluted rollers; the jute as it passes through receives a sprinkling of oil and water from perforated pipes attached to the machine overhead, the water-pipe being nearest the feeding end of the softener, and the oil pipe about two feet further along. The material is then allowed to lie a certain time in bulk, to permit of the fibre being thoroughly permeated with the oil and water. It is thereafter passed on to the breaker cards to be teased up and thoroughly mixed together. These machines have a large cylinder covered with wooden staves filled with steel teeth, and round this cylinder are smaller cylinders called 'strippers' and 'workers,' also covered with steel teeth. The material is discharged by these machines in a broad continuous band of fibre, technically called 'sliver,' into long cylindrical cans. Four of these broad slivers are wound into one ball for the next process, which is the finisher cards. These are similar to the breakers, but have finer teeth, and draw out the fibre and 'finish' it into a much smaller sliver. Three of the balls are now placed on each 'finisher,' and the material is discharged from this machine, again in one sliver, into cans, to be taken to the next



Jute Plant (*Corchorus capsularis*).
1, Flower; 2, fruit.

March to May. The plants grow to a height of ten or twelve feet, and reaping goes on from July to October, the plants being cut down when in flower. The fibre, which is in the inner bark, is separated by retting—i.e. steeping in water for days and even weeks. The best qualities are of a pale yellow or buff colour, with a silky lustre. Coarser kinds, unsuitable for textile purposes, are employed for the manufacture of ropes and paper. *Corchorus* requires a hot, moist climate, with abundant

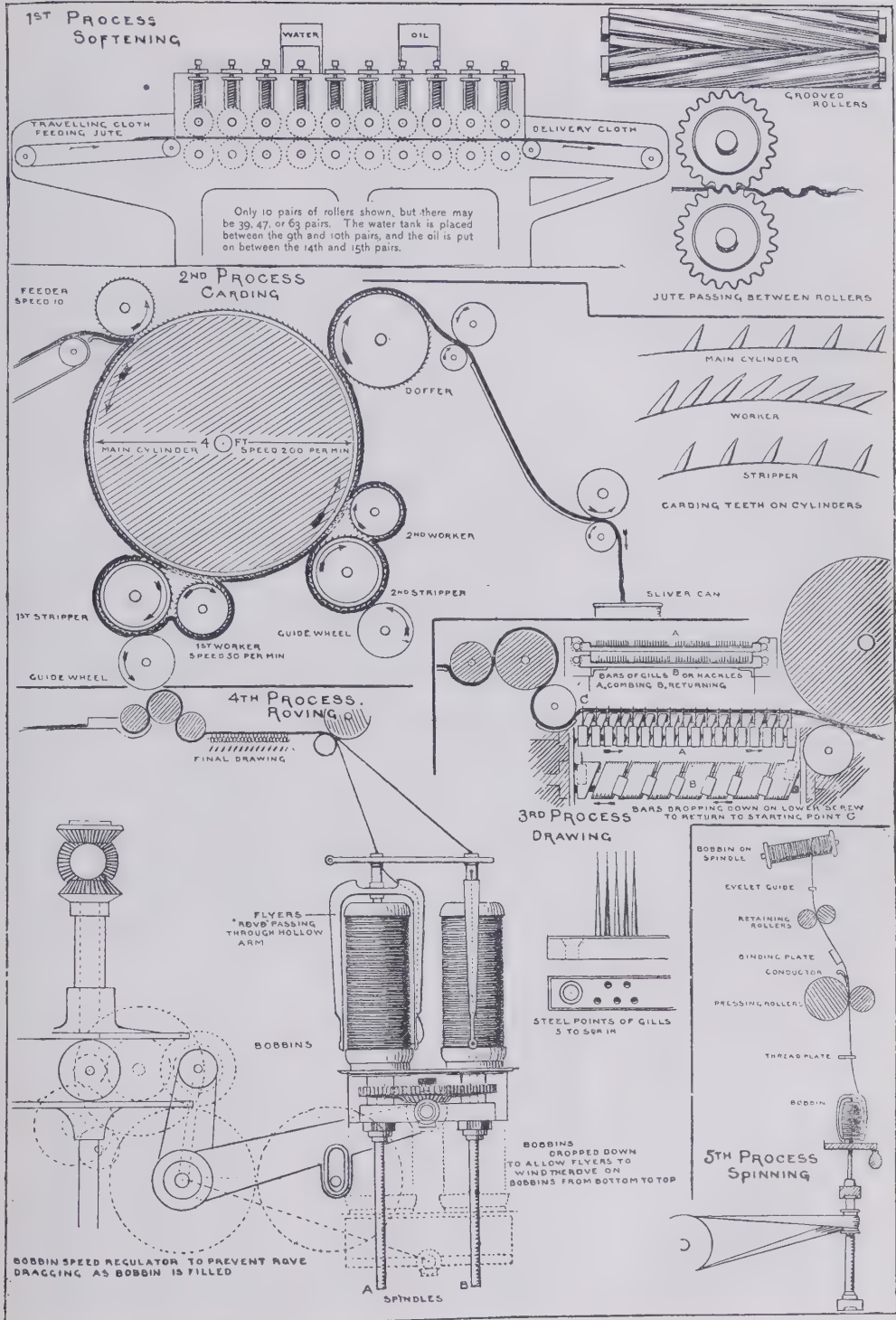
A further indication of the increased extent to which jute is manufactured in India is to be found in the growth of mills.

The jute-spinning and weaving establishment is constructed on the shed principle, being entirely lighted from the roof. The machinery is so arranged that the raw material is brought in at one end, and passes on from one process to another successively, until it is woven into cloth. The bales, weighing about 400 lbs. each, having been hard packed by hydraulic power to save cost of freight, the first process the jute undergoes is to be put through the jute opener, in order to soften it to a certain

process—viz. the first drawing frames. Their function is to draw out the sliver to a smaller size, and also to straighten or comb the fibre, so as to make it spin into a strong and level thread. Four of the slivers from the finisher cards are put through the first drawing frame, and are discharged by it in one small sliver. Two of those slivers are again put through the second drawing frame, and further combed and drawn out into one end. The cans are then taken to the roving frames. The material is again drawn out while passing through these machines, and is twisted into 'rove' whilst being wound on to the rove bob-

Exports from India of manufactured jute.

Year ending March 31.	Jute Bags. Number.	Jute Cloth. Yards.
1880	55,908,731	5,213,006
1885	82,779,207	15,344,279
1890	97,415,895	37,144,007
1895	143,444,320	103,116,727
1900	163,323,849	202,908,199
1904	206,207,745	552,320,434
1905	201,435,000	575,512,000



Jute Manufacture.

bins. The rove bobbins are taken to the spinning frames, and spun into yarn of various sizes. The yarns are spun with a hard twist for 'warps,' and with a softer twist for wefts. The warp yarns on bobbins are then passed on to the spooling machines, and wound on spools for the dressing or starching machines in the weaving section. The weft yarns are taken to the cop winding machines, and are wound into cops. These are put into bags by the winders, and are then ready to be issued to the weavers as required. The warp yarns are sometimes required to be reeled in hanks and bundles for the purpose of being bleached or dyed in various colours for stripes in the fabric to be woven.

The first process in the weaving department is to dress or starch the warp yarn. The starching-machines have large frames or banks at either end to hold the warp spools, and as many as from 600 to 800 spools can be put into one of these banks. The yarn is drawn through a back reed to keep all the threads at a uniform distance, and then passes through two pressing rollers, the lower one running into a long narrow box filled with the starching material. It is then drawn through the lease reed, and passes on to the large drying cylinders, which are heated by steam. Both sides then meet, and are run on to a loom yarn beam or roller flanged at the ends. This beam is placed in the drawing frame, and the web is drawn through the loom cams and reed, according to the quality or closeness into which it is to be woven. After that the beam is ready for the loom. The 'tenter,' or loom attendant, who has charge of a set of looms, places the yarn beam into the loom, adjusts it, and gives the web of warp yarn into the care of the weaver. The weaver is supplied with a bag of cops, which form the weft of the web, and are placed, one at a time, in a wooden shuttle. This shuttle is thrown by the picking arms of the loom between the warp threads, which are raised and lowered alternately by the action of the cams, interlacing with them and finally being driven into position by the lay of the loom, the cloth thus woven passing on to the cloth roller below. The web of cloth is taken off the loom cloth roller, and is carried into the finishing department. Here it is first passed through a cropping-machine, to take off any loose or rooty fibre; and then through a damping-machine to get a slight spray of moisture, in order that it may take on the proper finish of calendering or mangling. When finished, the web is measured and made up;

or if it is to be made into bags, it is taken to the sewing department, where it is cut up into prescribed lengths for the various sizes of bags. The bags are almost all sewn by machinery, although some of the heavier sacks are hand-sewn. Jute cloth is used for a great variety of purposes, chiefly as wrapping for the world's merchandise. See Sharp's *Flax, Tow, and Jute Spinning* (3rd ed. 1896), and Leggatt's *Theory and Practice of Jute Spinning* (1902).

Jute Bags, or GUNNY BAGS, are largely exported from India to many parts of the world—the name 'gunny,' however, being applied to the cloth as well as to the bags. In Lower Bengal, since 1850, the making of these bags has constituted a domestic industry, the entire native population being employed on them. At the present day, however, the hand-loom of India have been greatly superseded by steam factories, which manufacture enormous quantities yearly. Similar bags and cloth of jute are made also in Dundee, Scotland. In 1900-1 gunny bags were exported from British India to the value of nearly £3,000,000.

Jüterbog, tn., Prussian prov. of Brandenburg, 39 m. by rail s. of Berlin. The church of St. Nicholas (14th cent.), the Rathaus (15th cent.), the Abbot's House, and the three mediaeval gates, are notable features. Here in 1644 the Swedes defeated the Imperialists; and at Dennewitz, 2 m. to the s.w., Bülow defeated the French in 1813. Pop. (1900) 7,407.

Jutland, the largest and only continental prov. of Denmark, extends N. from Kolding Fjord and Ribe to the Skaw. Area, 9,746 sq. m. Jutland is separated by the Skager Rack from Norway and by the Kattegat from Sweden, and on the s. it touches Schleswig. For its natural features, see DENMARK. The drift-sand of Jutland forms flat, heathlike plains, called *altheden*, from the reddish-brown ferruginous sandstone which they contain. The chief trading place on the Baltic is Aarhus. Pop. (1901), 1,063,792.

Juvenal, whose full name was DECIMUS JUNIUS JUVENALIS, Roman satirical poet, was born probably between 60 and 72 A.D., and lived until after 128 A.D. He appears to have been the son of a rich freedman of Aquinum, to have spent his life, up to middle age, mostly in the practice of declamation at Rome, and to have published his works at intervals from about 102 A.D. onward. His extant works consist of sixteen satires, which were published in five books. The first includes the first five satires, and was published after 100 A.D.; the

second book, only the sixth (a long poem), published after 115 A.D.; the third book, the seventh, eighth, and ninth, published after 118 A.D.; the fourth book, the tenth, eleventh, and twelfth, but it gives no hint of its date; the fifth book comprises the remaining four satires, and must have been published after 128 A.D. A fragment of some twenty lines was recently discovered in the Bodleian Library at Oxford (see *Classical Review* for 1901). The first nine satires are quite distinct in character from the last seven. The former are attacks, in the bitterest and most violent language, on the crime, vice, and folly of Rome; the latter are rather moral essays on various subjects. In the former, Juvenal gives a most vivid picture of the state of Roman society in his day; but it is his own genuine indignation at vice, his old Roman severity of character, his love of simplicity, that impart force to his satire. He cannot, however, make his characters life-like; his satire is not, like that of Horace, a comedy of contemporary manners. His verse is powerful, but monotonous in its rhythm. He appeals to modern readers by the similarity in many points of our present rich, affected, and luxurious civilization to that of his own day; and by the power of his epigrams, many of which are household words as quotations. The best editions of his work are those by Mayor (1878), Pearson and Strong (1892), Lewis, with translation (1882), Duff (1898), Friedländer (1895). English translations by Dryden (1693; new ed. 1813), Gifford (1802), and Leeper (1891). See Housman's *D. Junii Juvenalis Satyræ* (1905).

Juvenile Offenders. See REFORMATORIES AND INDUSTRIAL SCHOOLS, and WHIPPING.

Juxon, WILLIAM (1582-1663), archbishop of Canterbury, born at Chichester; held pastorates at Oxford and at Somerton in Oxfordshire, and subsequently became in turn bishop of Hereford and then of London, a dignity to which in 1635 was added that of lord high treasurer. He resigned this post in 1641. He attended Charles I. on the scaffold, and at the restoration was appointed to the archbishopric of Canterbury. See *Memoirs of Archbishop Juxon* (1869).

Jyotisha, one of the six divisions into which the Brahmanical *Vedāngas*, a series of treatises supplementary to the original *Vedas* and *Brāhmaṇas*, are divided. It is ascribed to Lagadha or Lagata, and is the oldest existing systematic work on astronomy, probably dating from the first centuries after Christ.

K

K is the voiceless back stop; before utterance the breath is stopped by raising the back of the tongue. The sound varies according to the vowel which follows. Every *k* has a corresponding voiced stop, or *g*. In Semitic languages two *k*'s are regularly distinguished in writing. *K* and *Q* are the Latin forms of the symbols for these two *k*'s. In the Latin alphabet, and in the alphabets derived from it, the sound *k* is generally expressed by the symbol *c*, and *k* itself, for the most part, is rarely used. In the German alphabet, however, *k* is the usual sign.

Kaaba, the sanctuary, at Mecca, of the 'black stone,' the centre formerly of pagan, now of Islamic worship. Tradition associates the Kaaba with Abraham's casting out Hagar and Ishmael. The 'black stone' is an aerolite. See **MECCA**.

Kaalund, **HANS VILHELM** (1818-85), Danish poet, born at Copenhagen. His chief works are *Fabler* (1844); *Fabler for Børn* (4th ed. 1884); *Et Foraar* (6th ed. 1886); *Fulvia* (5th ed. 1903), a lyric drama; and *En Eftervaar* (4th ed. 1889).

Kaap, or **DE KAAP**, gold fields in Transvaal Colony, S. Africa, about 50 m. N.E. of Barberton.

Kabraji, **KAIKHOSROO NOWROJI** (1842-1904), Parsee journalist, was editor of *Rast Goftar* (1863-1904), an Anglo-Gujarati weekly, published at Bombay. He did much, by original dramas and novels and by translations of English classics, to spread the knowledge of Gujarati. He also wrote on social and religious questions.

Kabul. (1.) City, capital of Afghanistan, 190 m. W.N.W. of Peshawar, nearly 6,000 ft. above sea-level, on the Kabul R. It has an arsenal and a mint, and trades in carpets, shawls, silk and cotton goods. Much fruit is grown in the vicinity. The Bala



Pilgrims at the Kaaba, Mecca.

(Photo by M. Courtellemont.)

When *c* became ambiguous in English (see **C**), the use of *k* increased. In recent years the employment of *k* has become general in the English spelling of foreign words ('Koran,' not 'Coran'). Initial *k* before *n* has now become silent ('know,' etc.).

In the early Semitic alphabet **K** faced to the left, and the perpendicular stroke was long; Hebrew **ך** has lost one of the side strokes, and **כ** is a rounding of that form. In the Greek minuscule the attempt to write **K** in one stroke gives a form like *u*. The Semitic name *kaph*, Greek *kappa*, means 'palm' (of the hand).

Kabardia, fertile dist. on N. side of Caucasus, in Terek gov. of Russia; extends N. to the rivers Malka and Terek. Area, 3,800 sq. m. The Kabardintsi (32,000) are the only tribe of the Adighe (Circassians) which remains in the Caucasus. The Kabardia horse is noted. Total population of district, 70,000.

Kabbala. See **CABBALA**.

Kabir, Hindu religious reformer, lived at Benares about the close of the 14th century; endeavoured to blend Hinduism with Mohammedanism, and was the teacher of Nanak, founder of the Sikh faith.

Hissar, a former residence of the Ameer, dominates the city. Kabul was in 1879 the scene of the murder of the British envoy, Sir Louis Cavagnari. It was from Kabul that Lord (then Sir Frederick) Roberts set out, in August 1880, on his memorable march to Kandahar. Pop. probably about 100,000. (2.) River of Afghanistan, which rises in the Hindu-Kush, and joins the Indus at Attock. Length, 270 m. The confluence is at the head of the Indus navigation, and there is water-carriage for craft of forty or fifty tons for 59 m. up the Kabul R.

Kabyles. See **BERBERS**.



Views in Kabul.

1. General view from Asmai Heights. (Photo by Emmet.) 2. The Bala Hissar. (Photo by Lieut.-Col. Sir Edward Thackeray, K.C.B.)

Kachins, tribes of N. Burma, akin to the Chins and the Lushai. They show Caucasian features.

Kadapa. See CUDDAPAH.

Kadavu, or KANDAVU, one of the Fiji group. See FIJI ISLANDS.

Kadesh, several places in Palestine and Syria. KADESH-BARNEA (Gen. 14:7; Num. 13:26, etc.), in Arabia Petraea, 55 m. S. of Beersheba, was the headquarters of the Israelites for forty years prior to their entry into Canaan. From it Moses sent the spies to survey and report. Here also Miriam died, and Moses brought water from the rock.—KADESH OF ISSACHAR (1 Chron. 6:72) is near Taanach.—KADESH NAPH-TALI (Josh. 12:22, etc.) is in Upper Galilee, with Jewish and Roman remains.—KADESH ON THE ORONTES (in the Greek version of 2 Sam. 24:6) is the ruined city Kades, south of Emesa.

Kadiak. See KODIAK.

Kadija. See MOHAMMED.

Kæmpfeviser. See DENMARK—*Literature*.

Kæmpferia, a genus of perennial tropical plants belonging to the order Scitamineae. All the species are natives of Africa or Asia, and have mostly fleshy roots. Kæmpferias are not difficult of cultivation in the stove, a peaty soil being desirable. No water should be given during the period of hibernation.

Kaf, a mythical mountain range supposed by the Moham-medans to encircle the world, and to be the home of the giants, jinns, and fairies.

Kaffa. (1.) Or GOMARA, trib. state of Abyssinia, in the Galla country, 7° N. and 36° 30' E. Exports coffee to Mocha. Some of the natives profess a corrupt Christianity. The chief town is Bonga. (2.) See THEODOSIA.

Kaffir Beer (*tehwala*) is prepared from malted millet or Kaffir corn, which is crushed and allowed to ferment. It is a thick, yellowish, sour liquid of disagreeable odour. It is, however, refreshing, and possesses valuable dietetic properties. It is widely used as a remedy in cases of wasting diseases amongst the natives.

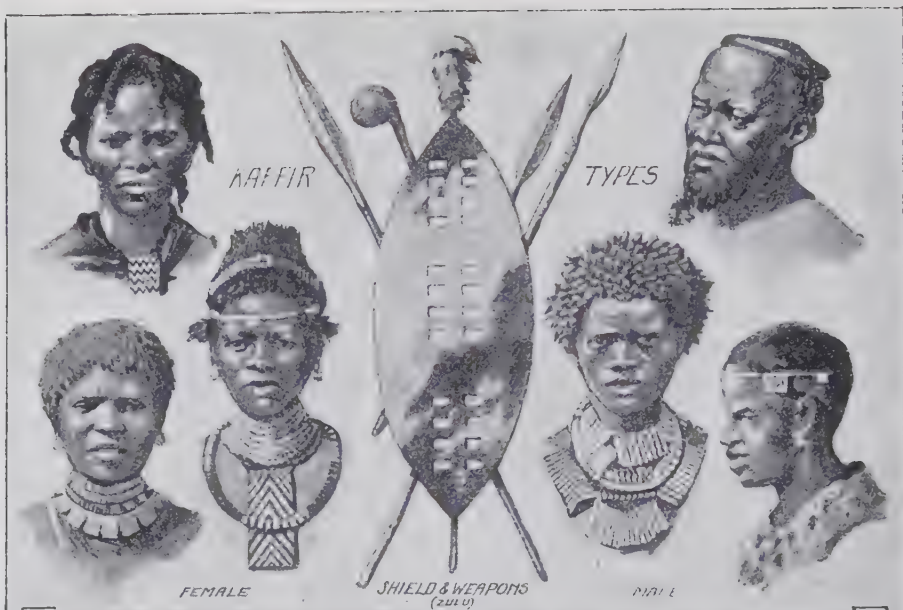
Kaffir Bread, the pith of the young shoots of *Encephalartos vaffer*, or bread-tree, a S. African cycad with a short cylindrical trunk and a terminal crown of coriaceous leaves. It is eaten by the natives.

Kaffir Corn. See DURRA.

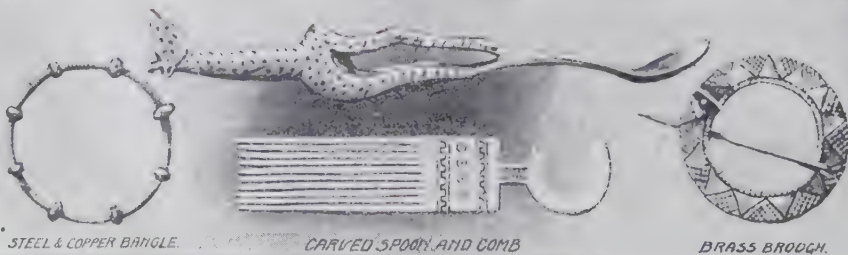
Kaffirs (properly spelled KAFFIRS; formerly CAFFRES) are the predominant native people of S. Africa, between the Zambezi R. and the Cape. The term Kaffir is an Arabic word for 'infidel,' and gives its name to Kafiristan (N. W. India) as well as to Kaffraria (S. E. Africa). But although

thus derived, this name is now specially applied by Europeans to the Bantus of S. Africa. It is somewhat elastic in its application, however. The Bechuanas, for example, do not strictly belong to the Kaffir group—a distinction verbally recognized by statisticians, even while they include Kaffirs and Bechuanas in one classification. Nevertheless, the latter are colloquially spoken of as Kaffirs. The Basutos, also, and the Mashonas, although of Bantu stock, are differentiated from the true Kaffirs, whose noblest characteristics are typified by the Zulus. It need scarcely be added that on no occasion is the term Kaffir ever applied to the aboriginal Vaalpens, Bushmen, and Hottentots, the former lords of the soil until the conquering Kaffirs came down upon them from the north and reduced the surviving remnant to subjection. The link uniting the various Kaffir nations is mainly one of language. They are a mixed people, in all cases of negroid type, but often showing a strong infusion of Arab or Galla blood, especially in the families of chiefs. This intermixture is assigned to times long antecedent to their advent in the region S. of the Zambezi. Dr. Latham regarded the Kaffir area as extending from the Cape to the equator, and even beyond. The name Kaffraria, however, is now restricted to the littoral between the Kei R. and Natal, although formerly it included all the territory between the Great Fish R. and Delagoa Bay. Little by little Kaffraria became absorbed by the Dutch and the British, until it has become a mere geographical expression. Natal was carved out of it in 1830-40; British Kaffraria was joined to Cape Colony in 1865; Pondoland was annexed in 1894; and in 1897 Zululand was united to Natal. During the long and arduous struggles between the colonists (often with the aid of British regulars) and the Kaffirs, the fiercest and most successful opposition came from the Zulu tribes, who, under the successive military autocrats of Tehaka, Penda, and Cetywayo, had been welded into a magnificent and almost invincible military organization. Dingaan, Langalibalele, Moshesh, Lobengula, and Khama were also notable native rulers. To-day the Kaffirs are all subject, directly or indirectly, to British rule. In Cape Colony, Natal, Orange River Colony, and the Transvaal they are more or less Europeanized, and work in the mines, in the construction of roads and railways, as farm labourers, and as domestic servants. The governor of Natal is em-

powered to call upon the chiefs to provide men (under pain of fine or imprisonment) for public works, the labourers receiving suitable wages. Labour is not compulsory in Cape Colony, but a yearly tax of 10s. is levied on every male native unable to show a certificate of three months' work. On proving certain qualifications, Kaffirs in Cape Colony and Natal may receive certificates of citizenship and become voters. In Basutoland, Bechuanaland, and Swaziland the native monarchies are preserved free of white control, beyond a reasonable supervision exercised by resident commissioners, order being maintained by native police under British officers. There are, moreover, numerous large 'locations,' or 'reserves,' throughout the other South African provinces, within whose limits the tribal life is continued; and even those Kaffirs who live on the estates of colonials are still partially under the authority of their chiefs. Each hut throughout British S. Africa pays a yearly tax to government, varying from 10s. to £1; and revenue duties are also laid on Kaffir beads, picks, hoes, blankets, shawls, and unmanufactured tobacco. Otherwise, the native organization, in these semi-independent territories, is intact. The king or chief is supreme, although guided to some extent by his prime minister and sub-chiefs. He administers justice 'in the gate,' and decides in all cases of murder, wounds, adultery, quarrels with foreigners, and theft denied. Kaffirs do not receive their full status as 'men' until they marry—an event sometimes postponed for years by the autocratic Zulu kings, for military reasons. Polygamy is practised by all who can afford to buy more than one wife. In a polygamous household the wives are usually divided into three groups—the houses respectively of the 'great' wife, of the 'right-hand' wife, and of the 'left-hand' wife. New accessions are relegated to one or other of these houses. Generally the wife first married is the 'great' wife. In the case of the blood-royal, however, the heir-apparent may have had many wives before his father's accession; but none of these can be the 'great' wife, as the next heir to the throne must be born 'in the purple.' Marriage between blood relations is strictly forbidden. Women may own property, but cannot inherit. Agriculture is the work of the women, who cultivate small plots of fertile soil, like the 'squaw patches' of the Red Indians. Their crops are sorghum (Kaffir corn), maize, pumpkins, melons, and 'sweet-reed.' From the first of these



ZULU KRAAL



Kaffir Types and Native Ornaments, with View of Zulu Kraal.

(Photo by X. P. Edwards.)

Kaffir beer is brewed. The Kaffir year is divided into three seasons: 'Green Heads' (the time of sprouting corn), 'Kindness' (summer), and 'Cutting' (harvest). Kaffirs are great owners of flocks and herds, cattle constituting their currency. Their arts include wood-carving, moulding pottery, and iron-smelting. Their garments, often dispensed with, are skins or European blankets—a leopard's skin denoting a chief. Weapons: assegais, shields, and knobkerries (clubs). Religion: various forms of witchcraft, with, in some cases, a modified worship of the sacred ox (*ixaka*). The Kaffirs bury their dead in a sitting posture. Under the peaceful conditions of recent years the Kaffirs have steadily increased in number, there being approximately over 610,000 in Cape Colony and British Bechuanaland, 837,000 in Natal, and 700,000 in the Transvaal. See *The Natives of South Africa*, ed. by the S. African Native Races Committee (1901); Theal's *History of South Africa* (1888-93); Statham's *Blacks, Boers, and British* (1882); Widdicombe's *Fourteen Years in Basutoland* (1892); and Hepburn's *Twenty Years in Khama's Country* (1895).

Kafiristan (*kafir*, a Mohammedan word for an 'infidel') is the territory on the s. slope of the Hindu-Kush, between Afghanistan and Kashmir. Spurs from the Hindu-Kush spread over the whole country, which is watered by tributaries of the rivers Indus and Kabul. The inhabitants, pastoral tribes called Siahposh, are backward in civilization, and practise polygamy. They were subdued by the Ameer of Afghanistan in 1895, Mohammedanism being then forced upon them. The country is of strategic importance as an outpost of the Indian frontier, owing to its command of the passes of the Hindu-Kush. Area, about 5,000 sq. m. See G. S. Robertson's *Kafirs of the Hindu-Kush* (1896).

Kaftan, JULIUS (1848), German theologian, was born at Apenrade in Schleswig-Holstein. Called to a professorship at Basel in 1881, two years later he succeeded Dörner at Berlin. His principal works are, *Das Wesen der christlichen Religion* (1881); *Die Wahrheit der christlichen Religion* (1884; trans. 1895); *Dogmatik* (1897). In general, Kaftan is an adherent of the so-called school of Ritschl, and his *Dogmatik* is the best and most complete systematic treatise that has issued from that party. See Lichtenberger's *Hist. of German Theol. in 19th Cent.* (trans. and ed. by W. Hastie, 1889), 585 f.; and Pfeiderer's *Die Ritschlsche Theologie*, pp. 100-122.

Kaga, or KASHIU. See KANA-ZAWA.

Kagera, or ALEXANDRA NILE, head-water of the Nile, consists of two head-feeders, the Akan-yaru and the Nyavalongo, and enters the Victoria Nyanza on the w. about 1° s. of the equator.

Kagoshima, tn., Japan, 88 m. s.e. of Nagasaki, on s.e. shore of Kiusiu I., in prov. of Satsuma, of which it is the capital. It manufactures Satsuma faience, arms, cottons, and cigarettes. It was bombarded by the British on Aug. 15, 1863. The town was the head of the Satsuma rebellion in 1877. Pop. (1893) 53,481.

Kagu (*Rhinocetus jubatus*), a curious bird found only in New Caledonia, and though generally resembling a heron, apparently most nearly allied to the cranes. It is rather bigger than the common fowl, with a powerful heron-like bill, and nostrils overhung by a rolled-up membrane. The plumage is of a slaty-gray colour, and there is a long pendent crest on the head; the bill and feet are orange red. The bird is now rare; it seems to be nocturnal, and feeds on worms, molluscs, and insects.

Kahlur. See BILASPUR.

Kahnis, CARL FRIEDRICH AUGUST (1814-88), German Neo-Lutheran theologian, was born at Greiz, and became professor at Breslau (1844) and Leipzig (1850). He was a man of fine rhetorical and literary gifts, but an able popularizer rather than a profound thinker; and his inconsequent theology brought him much bitter controversy, not least with his orthodox friends. His best-known works are *Die Lehre vom heiligen Geist* (1847); *Die Lehre vom heiligen Abendmahl* (1851); *Der innere Gang des deutschen Protestantismus* (1854; trans. by Meyer, 1856, as *A History of German Protestantism*), a valuable summary; *Die deutsche Reformation* (1872); *Die lutherische Dogmatik* (1874-5).

Kaiapoi, tn., South Island, New Zealand, 3½ m. from the sea and 12 m. N. of Christchurch. Pop. (1901) 1,795.

Kai-feng-fu, cap. of prov. Honan, China, 10 m. s. of Yellow R., enclosed in massive walls, and a place of busy trade. Under its ancient name, Pien-liang, was capital of the Sung dynasty (960-1126 A.D.). A Jewish community has existed here since 1183 A.D. Pop. about 100,000.

Kailas, or GANGRI, peak (21,810 ft.) of the Himalayas in W. Tibet; is looked upon by the Hindus as sacred; stands n.w. of Lake Manasarowar, and gives rise to the Indus, Sutlej, and Brahmaputra rivers.

Kainite, a mineral composed of magnesium sulphate and potassium chloride, found at Stassfurt in Bavaria. It occurs as a

grayish to yellow granular mass, and is a valuable source of potassium salts.

Kainsk, tn., Tomsk gov., Siberia, 180 m. E. of Omsk. Pop. (1897) 5,858.

Kaipara Harbour, inlet, w. coast of North I., N.Z.; the outlet for the kauri pine industry.

Kaiping, tn., China, prov. Pechili, 75 m. N.E. of Tientsin; with coal mines (at Tang-shan and Lin-si), iron mines, and cement works.

Kaira, munic. tn. and ancient city, Kaira dist., Gujarat, Bombay, India, 22 m. s. by E. of Ahmadabad. It is surrounded by walls, and has a richly decorated Jain temple. Pop. (1901) 10,392. The district has an area of 1,609 sq. m., and a population in 1901 of 716,332.

Kairana, munic. tn., Muzaffarnagar dist., United Provinces, India. Pop. (1901) 19,304.

Kairwan, decayed tn., 'the Mecca of N. Africa,' Tunisia, 80 m. s. of Tunis; is surrounded by walls, and contains a citadel and magnificent mosques, the principal of which is that of Okba, who founded the city in 669. The chief industries are the making of copper vessels, potash, salt-petre, morocco leather, and carpets. Pop. (1896) 26,000.

Kaisarieh (anc. *Cæsarea*), tn., vilayet of Angora, Asiatic Turkey, 160 m. S.E. of Angora. Greek and Roman Catholic bishops and an Armenian archbishop have their seats in the town. Pop. estimated at 72,000. See CÆSAREA.

Kaiser, the Teutonic equivalent for Cæsar, commonly used in speaking of the emperors of Germany. It is also sometimes used of the emperors of Austria.

Kaiserfahrt, the navigable channel of the mouth of the Oder, Prussia, about 3 m. long, connecting the Stettiner Haff with the Swine R.

Kaiserslautern, tn., Bavaria, prov. Palatinate, 42 m. by rail w. of Mannheim, with manufacture of cottons, woollens, furniture, sewing-machines, tobacco, iron and steel, beer, and bricks, also railway works and sawmills. Near here, in 1793 and 1794, the French suffered three defeats by the Prussians. Pop. (1900) 48,310.

Kaiser Wilhelm II. See NORD-DEUTSCHER LLOYD.

Kaiser Wilhelm Canal, also known as the North Sea-Baltic Canal, in Schleswig-Holstein, is 61 m. long, and extends from near Brunsbüttel on the Elbe to Holtenau on Kiel Bay. Breadth, at bottom, 72 ft.; at surface, 219 ft.; depth, 29½ ft. The passage occupies from eight to ten hours, and the saving is 200 m. on the Kattegat passage. Begun in June 1887, it was opened in June 1895. It does not yet pay its way.

Kaiser Wilhelm's Land, the N. part of German New Guinea, was declared a German protectorate in 1884. Area, 70,000 sq. m. The surface generally is mountainous. The chief productions are areca, sago, and cocoa palms, bamboos, ebony, cotton, coffee, and tobacco. The natives trade in copra and mother-of-pearl. Seat of government, Herbertshöhe in Bismarck Archipelago. Pop. (1902) 110,000.

Kaisong, or SONG-DO, tn., Korea, 35 m. N.N.W. of Seoul, was the capital from 910 to 1392. It manufactures ginseng and oiled paper. Pop. 60,000.

Kaithal, ancient tn. and munic. in Karnal dist., Punjab, India, 50

Kalahandi, or KAROND, feudatory state, Central Provinces, India. Area, 3,745 sq. m. Pop. (1901) 350,529.

Kalahari, a large basin or depression of the South African plateau, reaching from Cape Colony to the Zambezi, probably 400 m. from E. to W., and 600 from N. to S. Its general elevation is from 3,000 to 4,000 ft. Livingstone's Lake Ngami is the last remnant of the once numerous salt-pans. The water-courses are mostly periodic. Copious rains fall in the interior from August to April, and produce considerable vegetation of thorny trees and shrubs. The hot winds of the Kalahari have a great effect upon the cli-

culent leaves, and showy cymes of large purple, yellow, or scarlet flowers, each with four sepals, four petals forming a salver-shaped corolla, eight stamens, and four carpels. Among the best for stove cultivation are *K. farinacea* and *K. grandiflora*.

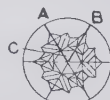
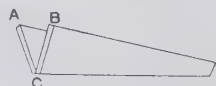
Kalat. See KHELAT.

Kalatch, river port, on Don, in S. Russia, connected with Tsaritsyn (45 m.) on the Volga. Population varies greatly.

Kalbe, or CALBE, tn., Prussian prov. of Saxony, on the l. bk. of the Saale, 17 m. by rail s. of Magdeburg, with textile and sugar manufactures. Pop. (1900) 12,281.

Kale, or BORECOLE, a section of cabbages which do not 'heart' after the manner of the common cabbage. All are very hardy. They like an open situation and deeply-dug and moderately enriched soil. For late autumn cutting, Sutton's A1, or dwarf green curled, should be sown in March and planted out in May. For midwinter cutting, Read's improved hearting is one of the best varieties. For spring use, asparagus kale and cottager's kale should be sown in early autumn.

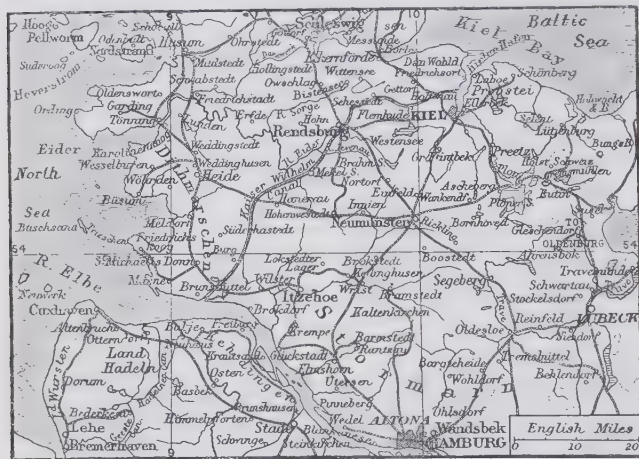
Kaleidoscope, an optical instrument invented by Brewster about 1815, became very popular as a toy. It consists essentially of a tube, within which are fixed longitudinally two mirrors at a certain angle ACB—any even submultiple of 360°, in practice generally 60°—an eyepiece at one end, and an object-box containing fragments of coloured glass at the other. On shaking the instrument, an infinite series of always symmetrical patterns is presented. See Brewster's *Treatise on the Kaleidoscope* (2nd ed. 1858).



Kaleidoscope.

External view, arrangement of mirrors AC and BC, and pattern as seen.

Kale-i-Sultanieh, CHANAK KALESSIA, seapt., Turkey in Asia, on E. side of Dardanelles, 20 m. s.w. of Gallipoli. It is strongly fortified. There are manufactures of pottery. Pop. 11,000.



The Kaiser Wilhelm Canal.

m. s.w. by s. of Ambala; traditionally connected with Hanu-mán, the monkey-god. It manufactures saltpetre and lac ornaments and toys. Pop. (1901) 14,408.

Kakapo (*Stringops habroptilus*), an aberrant parrot found in wooded regions in New Zealand. Its powers of flight are exceedingly limited, and it is hunted by the natives on foot with dogs. It is nocturnal in habits, and feeds on moss, seeds, berries, and so on. It climbs well and walks swiftly. No nest is built, and the eggs are laid in burrows. The upper part of the body is green, with yellow and brown markings, the lower of a yellowish tint. The plumage is soft and owl-like, as is also the face. The bill is very powerful.

Kakodyle. See CACODYL.

Kalafat, or CALAFATU, fort, tn., Roumania, on l. bk. of Danube, opposite Vidin. In 1854 it was the scene of a defeat of the Russians by the Turks. It has a trade in grain. Pop. 7,000.

mate of S. Africa. Estimated area, 350,000 sq. m., with a population of some 50,000.

Kalahasti, or KALASTRI, tn. in N. Arcot dist., Madras, India, 52 m. s.w. by w. of Nellore. Pop. (1901) 11,992.

Kalamata, or KALAMAI, seapt., cap., nomarchy of Messenia, Greece, at the head of the Gulf of Korone, 17 m. s.w. of Sparta. Oranges, figs, mulberries, and olives are exported, and silk is manufactured. The first national assembly of Greece was held here in 1821. Pop. (1896) 14,298.

Kalamazoo. (1.) City and co. seat of Kalamazoo co., Michigan, U.S.A., 144 m. by rail E.N.E. of Chicago. Its industries include celery-growing, paper, machinery, and wagon-making. Pop. (1900) 24,404. (2.) River of same state, flows W.N.W. for some 200 m. to Lake Michigan, entering 29 m. S. of Grand Haven.

Kalanchoe, a genus of tropical shrubs belonging to the order Crassulaceae, mostly natives of Asia or Africa. They have suc-

Kalendæ. See CALENDs.

Kalevala, the national epic of the Finns, written in the same metre as Longfellow's *Hiawatha*, was collected and strung together out of scattered fragments by Lönnrot (1835; definitive ed. 1849). It relates the conflicts between the brothers Väinämöinen and Ilmarinen and their enemy Lemminkäinen. Magic, especially the magic 'mill' *sampo*, plays a great part in the story. Eng. trans. by J. M. Crawford (1889).

Kalgan, or CHANG-CHIA-KU, walled frontier town of N. China, 110 m. N.W. of Peking, in 40° 50' N., 114° 55' E., on the main route across Mongolia from Peking to Kiakhta, in Siberia, and an important centre of the tea trade. Pop. estimated at 70,000.

Kalgoolie, tn., E. Coolgardie gold fields, W. Australia, 340 m. E.N.E. of Perth. Pop. (1901) 18,000.

Kali. See ALKALI.

Kālī, Indian goddess of destruction, is the wife of Siva. It was in her honour that the Thugs used to strangle their victims.

Kālidāsa, Indian poet, belongs to the post-Vedic period of Sanskrit literature. Tradition assigns him to the 1st century B.C.; modern scholars to the 3rd century A.D. His powers of imagination and description, and his grace of diction, place him among the greatest of Oriental poets, though to Western taste his work is marred by extreme artificiality. He wrote three famous plays—*Sakuntala*, *Vikramorvasi*, and *Agamitra*, of which the first was translated by Sir William Jones (1789), and again by Monier Williams (new ed. 1890); also two epics, besides lyrical pieces. One of these epics, the *Raghuvamśa*, was translated into English verse by P. de Lacy Johnston (1902).

Kalif. See CALIF.

Kalimno, or KALYMNOS, isl. off S.W. coast of Asia Minor, 15 m. N.W. of Cos. It is noted for its honey, and is the headquarters of the sponge industry of the Levant. Chief town, Kalimno, on S.E. coast. Area of island, 42 sq. m. Pop. 9,000.

Kalinga, one of the nine ancient kingdoms of S. India, supposed to have extended from Pulicat to Chicacole along the E. coast of Madras, from 13½° to 18½° N.

Kalingapatam, tn. and port, Madras, India, on Bay of Bengal, 95 m. S.W. of Ganjam; the only safe roadstead in 400 m. of coast during the S.W. monsoons. Pop. about 5,000.

Kalisz. (1.) Province of Russian Poland, touching Prussia on W. and N.W. Area, 4,392 sq. m. Pop. (1897) 846,719. The surface is usually sandy and flat. Agricul-

ture is comparatively advanced; kitchen-gardening and cattle-raising flourish. Important industrially, it manufactures cottons, cloth and ribbons, cement, soap, candles, vinegar, pottery and glass, spirits, sugar, beer, tobacco, leather, and flour. Of the people nearly 700,000 are Roman Catholics, nearly 80,000 Protestants, and about 70,000 Jews. (2.) City of Russian Poland, cap. of Kalisz gov., some 150 m. W.S.W. of Warsaw. It is the see of a Roman Catholic bishop, and an educational and industrial centre, with manufactures of leather, cloth, soap, sugar, tobacco, beer, and spirits. Pop. (1897) 21,680, about one-third Jews.

Kalk, tn., Prussian prov. of Rhineland, 2 m. by rail E. of Cologne, with iron works, chemical, machinery, and other factories, breweries, and brick works. Pop. (1900) 20,606.

Kalk Bay, seaside resort on N.W. shore of False Bay, Cape Colony, British S. Africa, 12 m. S. of Cape Town.

Kalladakurichi, or KALLADAKURICHI, tn., Tinneveli dist., Madras, India, 15 m. S.W. of Tinneveli. Pop. (1901) 14,913.

Kalmar, cap. of Kalmar co., on an island in Kalmar Sound, Sweden, once strongly fortified; has a fine cathedral (1660-99), and Kalmar Castle, a 12th century edifice. It has shipbuilding yards, tobacco, chicory, and match manufactures. Here was drawn up (1397) the Act of Union between Sweden, Norway, and Denmark, conferring the three crowns on Margaret of Denmark. Pop. (1901) 12,715.

Kalmia, a genus of hardy evergreen American shrubs belonging to the order Ericaceæ, valuable as ornamental plants and for their hardness. They prefer a peaty soil, and like abundant moisture at the roots. They may be propagated by seeds sown in pans of sandy peat in a cool greenhouse or frame; or by cuttings of half-ripened wood, placed in sandy peat under a hand-glass; or by layers. The flowers are showy, usually white or pink in colour, more or less bell-shaped, and arranged in terminal cymes. The best known species is *K. latifolia*, the so-called American laurel, or calico bush, which grows to a height of from five to six feet, with leaves dark green above and light green below.

Kalmuks, KALMUCKS, or CALMUCKS, a section of the Mongol race, found in three main divisions: (1) on steppe of lowest Volga valley, around Astrakhan; (2) in Zungaria, Kulja, and adjacent regions of Chinese Central Asia; (3) in Tsadam, Koko-nor, and other parts of N. Tibet and S.W.

Mongolia. In districts (2) and (3) the Kalmuks are called Eleuths or Oliuts. Their chief historical centre has been in Zungaria, where they founded a short-lived empire in the 17th and 18th centuries. From the Volga steppe took place, in 1771, the famous migration of the Kalmuks (70,000 families) from Russian to Chinese territory, described by Pallas, De Quincey, and others. At present 160,000 Kalmuks are reckoned under Russian rule. In Chinese territory their number is estimated at from 250,000 to 850,000. See MONGOLS.

Kalna, or CULNA, tn., Bardwan dist., Bengal, India, on r. bk. of Bhagirathi, 42 m. N. of Calcutta, with handsome Hindu temples. Pop. (1901) 8,121.

Kalnoky, GUSTAV SIEGMUND, COUNT (1832-98), Austrian statesman, born at Lettowitz, of an old Transylvanian family; was ambassador at St. Petersburg (1880), and minister of foreign affairs (1881-95). He was specially instrumental in bringing about more amicable relations between Russia and Austria, but his friendliness did not prevent him from effectively opposing the intrigues of Russia in Bulgaria (1886).

Kalocsa, tn. and archiepis. see, Hungary, co. Pest, near l. bk. of Danube, 86 m. by rail S. of Budapest. It possesses a fine cathedral, an archiepiscopal palace, and an observatory. Pop. (1900) 11,372, mostly Magyar Catholics, who are chiefly engaged in the fisheries on the Danube.

Kalpasūtras, a series of manuals of ceremonial in connection with the Vedic sacrifices. Together they form one division of the *Vedāngas*, treatises supplementing the *Vedas* and *Brāhmanas*.

Kalpi, or CALPEE, tn., Jalaun dist., United Provinces, India, on r. bk. of Jumna, 45 m. S.W. of Cawnpur. It was connected with incidents in the mutiny. It has manufactures of cotton, paper, and sugar. Pop. (1901) 10,139.

Kalubich, gov., Lower Egypt, on E. of Nile and N. of Cairo. Area, 352 sq. m. Pop. (1897) 371,465.

Kaluga. (1.) Government of Central Russia, bounded by Moscow on the N. Area, 11,940 sq. m. Pop. (1897) 1,185,726. The country is mostly level. The Oka is the chief river. Iron, coal, chalk, ochre, lime, limestone, potters' earth, and phosphorites are extracted. The soil is for the most part poor and heavy. The chief industrial establishments are iron works, cotton, match, paper, and cloth manufactures, tanneries, distilleries; important collieries. (2.) City and episc. see, cap. of above gov., on l. bk. of Oka, 100 m. S.W. of Moscow. There are manufactures of soap, agri-

cultural machinery, bricks, pottery; tanneries, breweries, and iron foundries, with leather, fur, and confectionery industries. Pop. (1897) 49,728.

Kalusz, tn., Austrian Galicia, 32 m. by rail N.W. of Stanislaw; with salt mines. Pop. (1900) 7,821.

Káma, or **KÁMÁDEVA**, the Indian god of love. He is represented as riding on a sparrow, holding in his hand a bow of sugar-cane and five arrows—the five senses.

Kama, riv. of E. Russia, the most important affluent of the Volga, having a length of 1,170 m., and a basin of 202,600 sq. m. It rises in Vyatka government, and flows almost due N., then N.E., and after entering Perm makes a sharp turn to the S., and so continues (navigable from Solikamsk) to Perm city. From Perm to its junction with the Byelaya it flows S.W., and its depth reaches fifty feet. After meeting with the last-named tributary (navigable from Ufa), which brings it most of the drainage of Ufa government, the main stream turns almost due W. till it falls into the Volga 40 m. below Kazan. Its principal affluents are the Vyatka and Byelaya. By the Catherine Canal, between the Northern and Southern Keltma, the Kama is joined to the Vichегда, and so to the Northern Dvina and the Arctic Ocean.

Kamala, a granular reddish powder, consisting of the small glands and hairs from the surface of the capsules of the Indian tree *Mallothus philippinensis*. Its value in medicine as an anthelmintic depends on a resin, which constitutes four-fifths of its weight. It is a powerful gastro-intestinal irritant.

Kamchatka, peninsula in E. Siberia. A range of mountains averaging from 4,000 to 5,000 ft. runs down the centre. Volcanoes are very numerous, twelve being active, among them being Klyuchevskaya (over 16,000 ft.), Sheluch, Belaya Sopka (the most imposing of the extinct volcanoes), and Avacha, near Petropavlovsk. The slopes of the central range consist of swampy valleys, separated by elevated forests, and in the N. of bush-covered plains. The Kamchatka R. (300 m.) is the longest stream, and is navigable by boats to Sheromi. Iron, copper, and coal exist. Chief occupations: fishing, seal and walrus hunting, and the chase—especially sable. The climate is severe. The winds are very violent, and snow falls to a great depth. The population consists principally of Kamchadales, with a large proportion of Russians and a few Koryaks. Area, 104,300 sq. m. Pop. 8,400.

Kamenets-Podolsk, tn., S.W. Russia, cap. of Podolia gov., 250 m. N.W. of Odessa, on a tributary of the Dnieper. It has a brewery, and tobacco, wadding, and mineral water manufactures. The town was annexed by Russia in 1795. Pop. (1897) 34,483, of whom more than 10,000 are Jews, many of whom suffered in the riots and massacres of 1905.

Kamerun, or **CAMEROON**, German colony of W. Africa, 191,130 sq. m. in area; extends for some 200 m. along the Bight of Biafra. Its boundaries touch the Benue, Lake Chad, and the Shari valley. The coast lands are low, but the interior is reported to be a grassy plateau, rising rapidly from a narrow and fertile strip of coast-land. North of the plateau



Kamenskaya, tn., territory of the Army of the Don, S. Russia, 65 m. N. of Novo-Cherkask, on the r. bk. of the N. Donets. Pop. (1897) 23,576.

Kamenz, tn., kingdom of Saxony, 32 m. by rail N.E. of Dresden; birthplace of Lessing (1729-81). The chief products are cloth, pottery, and glass. Pop. (1900) 9,726.

region there are mountain masses and dense forests. Kamerun Mt., or Monga-ma-Loba, is an isolated volcanic mass rising some 13,700 ft. on the coast. Coffee, cocoa, tobacco, rice, maniocs, and yams are grown. The rainfall is extremely heavy in the cool period from June to September. The natives are Bantus on the coast lands, and Sudanese in the in-

terior. Rubber, palm kernels, palm oil, ivory, cocoa, copal, copra, and kola nuts are exported. Kamerun was made a German protectorate in 1884. The seat of government has been at Buša since April 1901, but the chief town is Duala (Kamerun). Pop. 3,500,000.

Kames, the same thing as Eskers and Asar. See **ESKERS**.

Kames, **HENRY HOME**, **LORD** (1696-1782), Scottish judge and metaphysical writer, born at Kames, Berwickshire, and was elevated to the bench (1752). He was a voluminous writer, with a considerable knowledge of law and a taste for metaphysics; but his books are badly written and superficial, though ingenious and

Kampen, tn., prov. Overijssel, Netherlands, near mouth of the IJssel, 8 m. by rail N.W. of Zwolle. Here is the theological seminary of the Christian Reformed community. Pop. (1899) 19,664.

Kamperduin, coast vil., Netherlands, prov. N. Holland, 27 m. N.W. of Amsterdam. Here Admiral Duncan defeated the Dutch fleet, Oct. 11, 1797.

Kämpfer, **ENGELBERT** (1651-1716), German traveller, born at Lemgo, Westphalia; travelled in Persia, Arabia, Malabar, Ceylon, Bengal, Sumatra, Java, and Japan (1690). Works: *Amoenitates Exoticæ* (1712) and *History of Japan and Siam* (1727), published in English by Sir Hans Sloane.

Kampti. See **KAMTHI**.

designates coolies and contract labourers. Kanaka labour was formerly largely employed in Australia, especially in the Queensland sugar industry, where there were about 9,000 in 1903. From the end of 1906 their importation will be prohibited.

Kananur, or **KANANORE**, seapt. and military stn., Malabar dist., Madras, India, 53 m. N.W. of Calicut; exports grain, timber, and cocoanuts. Pop. (1901) 27,811.

Kanara, a strip of country on the W. shore of India, between the W. Ghats and the Arabian Sea. It embraces (1) **N. KANARA**, with capital harbour, and an area of 3,910 sq. m., in the Bombay Presidency; (2) **S. KANARA**, with



Kandy: the Lake and the Town.

(Photo by Skeen.)

stimulating. See Tytler's *Life and Writings of Hon. Henry Home of Kames* (1807).

Kaministiquia, riv. of Canada, rising in S.W. of Lake Nipigon, Ontario, and flowing S. and E. to enter by three arms into Thunder Bay, Lake Superior. In it is the Kakabeka Fall (150 ft. wide and 130 ft. high).

Kamishin, tn., E. Russia, Saratov gov., 110 m. S.S.W. of Saratov city, on r. bk. of Volga. Pop. (1897) 15,934.

Kamloops, health resort in Yale dist., British Columbia, Canada, 251 m. N.E. of Vancouver city. It gives its name to a variety of 'steelhead' trout found in the Thompson and other rivers. Pop. (1901) 1,594.

Kamrup, dist., Assam, British India, in valley of Brahmaputra. Area, 3,660 sq. m. Cap. Gauhati. Pop. (1901) 589,187.

Kamtchatka. See **KAMCHATKA**.

Kamthi, cantonment tn., Nagpur dist., Central Provinces, India, 8 m. N.E. of Nagpur. Exports grain and timber. Pop. (1901) 38,888.

Kamyshin. See **KAMISHIN**.

Kanagawa, seapt., Honshiu, Japan, on Tokyo Bay, 1½ m. N.N.W. of Yokohama. As a treaty port it was superseded by Yokohama in 1858.

Kanakas, general term for Polynesians, used by the whites of Australasia, Polynesia, and the United States. It usually

cap. Mangalore, and an area of 3,902 sq. m., in the Madras Presidency. Pop. (1901): N. Kanara, 454,490; S. Kanara, 1,134,713.

Kanarese, Dravidian people of S. India, some ten millions in number, and inhabiting the plateau of Mysore, part of S. Bombay, and the Kanara country. They possess an alphabet and a written literature, with works dating back to the 12th century. See **DRAVIDIAN**.

Kanaris, **CONSTANTINE** (1785-1877), a Greek naval hero who figured in the war of independence; born in the island of Psara. In 1822 he twice blew up the Turkish flagship, and in 1824 all but burned the whole fleet at Alexandria. He was minister of

marine (1854-5), and for short periods in 1862, 1864, and 1865 head of the government.

Kanauj, ancient city, Farukhabad dist., United Provinces, India, 49 m. N.W. of Cawnpur. Now in a ruined condition, it was up to the 12th century A.D. a most important place. In 1018 it was taken by Mahmud of Ghazni, and again, in 1194, by Mohammed Ghorî. Here, in 1540, Humayun was defeated by Sher Shah. Pop. (1901) 18,552.

Kanawha, GREAT, riv., U.S.A., 1. bk. trib. of Ohio; rises in w. of Carolina under the name of New R., flows N. across S.W. Virginia, and then N.W. across

Douglas W. Freshfield. See his *Round Kangchenjunga* (1903).

Kan-chau-fu, city in prov. Kan-su, China, on the Hei-ho, a branch of the Etsin-gol. Pop. from 15,000 to 20,000.

Kandahar, or CANDAHAR, fort. tn. and cap. of prov. of same name, in S. Afghanistan, in a fertile plain (alt. 3,500 ft.) 210 m. S.W. of Kabul. The chief products are silk and felt. Fruit is largely grown. Traditionally founded by Alexander the Great, it was occupied by the British in 1839, and was successfully defended by General Nott in 1842. It was again entered by the British in 1879, and the following year

are the botanic gardens of Peradenia. Tea, cocoa, pepper, cinchona, vanilla, areca nuts, coconuts, and coffee are cultivated. Pop. (1901) 26,519.

Kane, tn. in McKean co., Pennsylvania, U.S.A., 95 m. E.S.E. of Erie; has repair shops of Philadelphia and Erie Ry. Pop. (1900) 5,296.

Kane, ELISHA KENT (1820-57), American Arctic explorer, born at Philadelphia; was surgeon and naturalist to the first Grinnell expedition in search of Sir John Franklin (1850-1), but commanded the second (1853-5). He published *The United States Grinnell Expedition* (1854) and *The Second*

Mt. Sinvu.

Mt. Kanchanjunga.



Mount Kanchanjunga, from Phalut.

(Photo by Johnstone & Hoffmann.)

W. Virginia to its junction with the Ohio at Point Pleasant. Its length is nearly 400 m., and the area of its drainage basin 16,690 sq. m. It is navigable to Kanawha Falls, W. Virginia.

Kanazawa, cap. of prefecture of Ishikawa (which includes Kaga and Noto provs.), on w. coast of mainland of Japan, 125 m. N.E. of Kyoto, about 36° 30' N., 136° 40' E. Manufactures porcelain (Kutani), fans, silks, and inlaid bronzes. Pop. (1898) 83,632.

Kanchanjunga, or KINCHINJUNGA, highest point of the Nepal Himalayas, N. India, rising to more than 28,000 ft. In 1899-1900 it was visited by Mr.

was besieged by Ayub Khan, being relieved by General (now Lord) Roberts in August 1880, after a magnificent march from Kabul. Pop. 25,000 to 30,000.

Kandhla, munic. tn., Muzaffarnagar dist., United Provinces, India, 35 m. N.W. of Meerut. Pop. (1901) 11,563.

Kandy, the old cap. of Ceylon, India, lies near the centre of the island, on an artificial lake, 75 m. by rail N.E. of the new cap., Colombo. The temple of the sacred tooth of Buddha attracts crowds of pilgrims. Much has lately been done to restore and preserve the unique Kandy decorations. Three miles distant

Grinnell Expedition (1856). See *Life* by Elder (1857).

Kane, SIR ROBERT JOHN (1809-90), Irish chemist, born at Dublin, and from 1831 to 1845 was professor of chemistry at the Dublin Apothecaries' Hall; professor of natural philosophy to the Royal Dublin Society (1834-47); president of the Royal Irish Academy (1877). His chief publications were *Elements of Practical Pharmacy* (1831); *Elements of Chemistry* (1841-3); and *Industrial Resources of Ireland* (1844).

Kanea. See CANEA.

Kanem, former state of Sudan, Africa, now part of French Chad territory. Area, from 27,000 to

30,000 sq. m. It lies along the N. and E. shores of Lake Chad. The Kanembus number some 100,000, and have their chief settlements at Mao, to the E. of the lake, and at Ngigni, near the N.W. end. From the 12th to the 14th century it was the centre of an extensive Mohammedan empire. It became French in 1899.

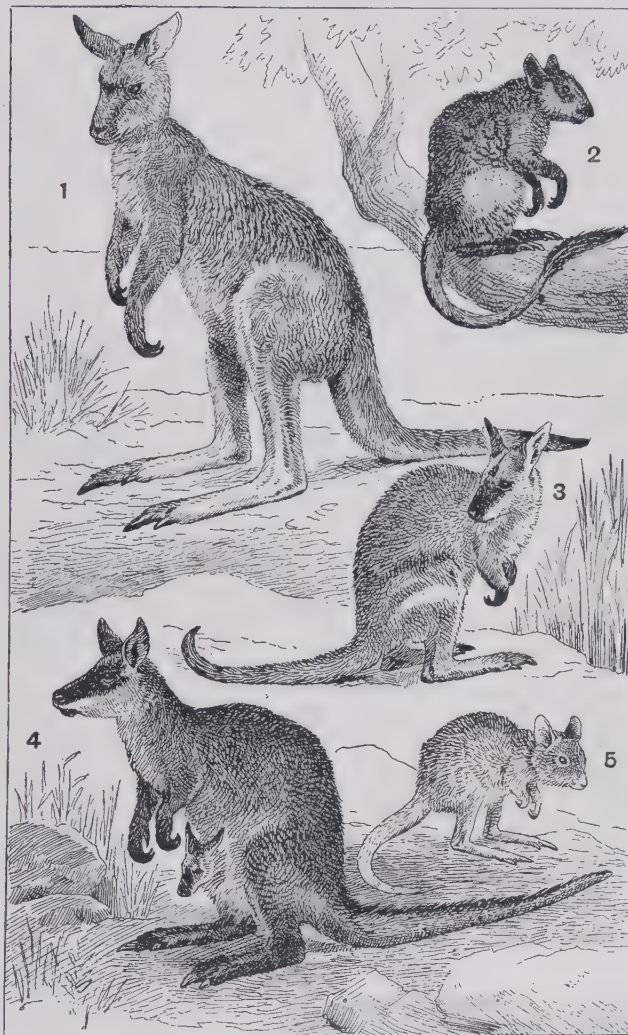
Kanev. See KANYEV.

Kangaroo, a marsupial specially modified for progression by leaping; is confined to the Australian region. The great kangaroo, or 'boomer,' or 'old man' (*Macropus giganteus*), attains a height of about five feet when standing upright. The fore limbs are very short, the hind long, with powerful and elongated feet. The tail is long, thick, and tapering, and helps to support the body when the animal stands upright. The fore limbs bear five digits armed with strong claws; the hind have only four, and these strangely modified. The first (great) toe is absent; the second and third are long, but very slender, and are bound together by skin (syndactylous); the fourth is enormous, and takes the chief part in the support of the body; while the fifth, though only half its length, is also strong. With the claw of the fourth toe a kangaroo can inflict a terrible wound. The head is small, with pointed muzzle and large ears. In accordance with its purely vegetarian habits, we find that canine teeth are absent in the adult, though there is a small canine in the upper jaw in the young animal. The incisors are powerful, with a cutting edge. The fur is soft and woolly, and lighter in tint below than above. In the female there is a large pouch, in which the young are placed at birth. At this time they are minute—not more than an inch in length—and, being too immature to suck, have milk pumped into them by the mother. They remain within the pouch until able to run by the side of the parent. Not until some eight or nine months after birth are they left to shift entirely for themselves. Only one young one is produced at a birth. As regards internal organs, the stomach is large and complex, and the characteristic marsupial or epipubic bones are present. The giant kangaroo is an inhabitant of open plains, and occurs throughout most of Australia and Tasmania. The flesh was formerly an important article of diet among the natives. In feeding, the kangaroos often go down on all fours; but the habitual method of progression is by enormous leaps. They are social animals—timid and inoffensive, save when brought to bay. In addi-

tion to the giant kangaroo, there are several allied species of *Macropus*, which inhabit rocky districts, such as the red kangaroo of Southern and Eastern Australia. The name wallaby, or brush kangaroo, is given to a group of small and highly-coloured species

forms, such as the tree kangaroos (*Dendrolagus*) of New Guinea and Queensland, the rat kangaroos (potoros), and others.

Kangaroo Apple, an Australian shrubby plant (*Solanum aviculare*) which grows to a height of about six feet, and bears



Kangaroos.

1. Great Kangaroo. 2. Tree Kangaroo. 3. Agile Wallaby. 4. Black Wallaby. 5. Rat Kangaroo.

which occur in the dense scrub found in certain parts of Australia. An example is the red-necked wallaby (*M. ruficollis*) of New South Wales and Victoria. To the kangaroo family (Macropodidae) there also belong a number of smaller and much modified

oval yellow fruits that are edible, and not unpleasant when ripe.

Kangaroo Grass, a tall leafy grass (*Anthistiria ciliata*) which is common in Eastern tropical regions. It is characterized by having long, bent awns. It is valued as fodder for stock.

Kangaroo Hound has been evolved from the greyhound, crossed with the collie, with perhaps a strain of the aboriginal wild dog, or 'dingo,' of Australia. It stands about twenty-eight inches high, is shaped like a thick greyhound, but carries a bushy tail. In addition to hunting the kangaroo, this hound is a singularly intelligent cattle-dog.

Kangaroo Island, S. Australia, at s. of Gulf of St. Vincent, separated from Yorke's Peninsula by Investigator Strait. Its greatest length is 85 m.; greatest breadth, 30 m.; and area, 1,680 sq. m.

Kangra, or NAGARKOT, tn. and former cap. of dist. of same name, Punjab, India, 92 m. N.N.E. of Amritsar. The town has a population (1901) of 4,746. The district, lying between the river Beas and the Himalayas, has an area of 9,039 sq. m., and a population (1901) of 763,124. The headquarters are at Dharmala. Tea

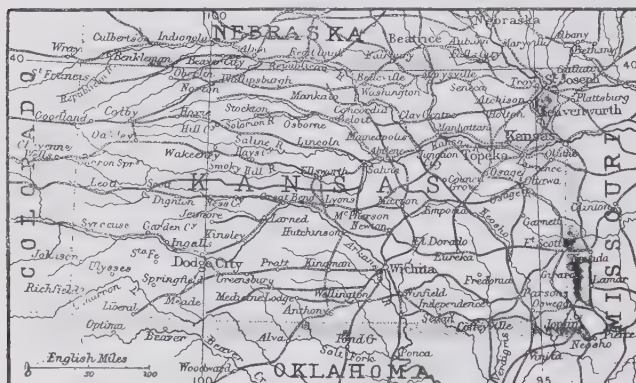
of Sokoto. According to the report of Sir F. D. Lugard (1903), its walls are 11 m. in perimeter, 40 ft. thick at the base, and from 30 to 50 ft. in height. The king's palace is in an enclosure of some 33 acres. The distinctive manufactures are cotton cloths, Hausa gowns or 'tobes,' embroidered shoes, slippers, riding-boots, and saddles. It was occupied by a British punitive expedition in February 1903.

Kansas. (1.) Central state of U.S.A., organized as a territory in 1854, and admitted as a state in 1861. It lies between lat. 37° and 40°, and long. 94° 30' and 102°, and has an area of 82,080 sq. m. It forms a portion of the Great Plains, with a general rise from E. (750 ft.) to W. (4,000 ft.). A part of the E. boundary of the state is formed by the (navigable) Missouri R. Other streams are the Arkansas, the Kansas, and its branches the Smoky Hill and the Republican; but none of these are

souri at Kansas City, on the E. boundary of the state. Its drainage area is 59,256 sq. m., and the length, following up the Smoky Hill Fork, is about 700 m.

Kansas City. (1.) City, Missouri, U.S.A., co. seat of Jackson co., on r. bk. of the Missouri R., at the mouth of the Kansas R., adjoining Kansas City, Kansas. The business portion lies in the level bottom land, while the residential portion is mainly on the bluffs to the S. It is one of the most important railway centres of the country. The leading products of the industries are clothing, confectionery, flour, foundry and machine-shop products; and malt liquors, meat-packing, printing, and publishing are among the chief industries. There is a large trade in grain. Pop. (1900) 163,752. (2.) City, Kansas, U.S.A., co. seat of Wyandotte co., on the Missouri, at the mouth of the Kansas R. Next to Chicago, it has the largest stockyards and meat-packing houses in the country. Here is a Methodist university. Pop. (1900) 51,418.

Kan-su, prov. in N.W. China. Its area is 88,610 sq. m. (Williams), and it lies between lat. 32° 30' and 40° N., and long. 98° and 108° E. Traversed by different chains of the Nan-shan Mts., the province may be roughly divided into three parts:—(1.) The southern part, consisting of the valleys of the upper waters of the Wei R. of Shen-si and of the Kia-ling of Sze-chuen. (2.) The eastern half, an undulating plateau, over 4,000 ft. above the sea, and composed of loess, traversed by deep ravines, with corn fields and villages on the plateau. (3.) The part west of Lan-chau-fu, hemmed in between the mountains and the desert, and forming a tongue-like wedge through which runs the road to West and Central Asia. Opium, wheat, millet, beans, tobacco, sheep's and camels' wool, grapes, and rhubarb are among the chief products. Coal is common, but is not worked systematically. In the 8th century a large band of Mohammedan Turcomans settled in the province, and became known as Tungsans or Dungsans. In 1370 they were followed by a stricter sect known as Salars. These peoples have fomented frequent rebellions against the Chinese, the more recent being in 1820, 1861-73, and 1895-6. These outbreaks have been attended with frightful massacres of both parties. Near Si-ning-fu are the large Buddhist lamaseries of Kumbum and Labrang. Lan-chau-fu is the capital. Si-ning, Kan-thau, Liang-chau, Su-chau, and Ning-hsia are the chief cities. Pop. (1901) 10,386,000.



Kansas.

plantations occupy some 10,000 ac., extending along the base of the Chumba range from Dharmala and Kangra eastwards to the Mundi state, a distance of about 35 m. Dharmala was the centre of the earthquake which shook a large part of N.W. India on April 4, 1905, and, as well as Palampur, 22 m. farther east, suffered severely.

Kanizsa, two tns. of Hungary. (1.) NAGY KANIZSA, in Zala co., 136 m. S.W. of Budapest. Pop. (1900) 23,255. (2.) O or OLD KANIZSA, on the Theiss, in Bacs-Bodrog co., 15 m. S.S.W. of Szege-din. Pop. (1900) 16,515.

Kankakee, city, Illinois, U.S.A., co. seat of Kankakee co., 55 m. S. of Chicago. Here is a Roman Catholic college. The manufactures include ploughs, starch, and iron bedsteads. Pop. (1900) 13,595.

Kano, tn. and trading centre, N. Nigeria, Africa, 220 m. S.S.E.

navigable. In the W. third of the state the rainfall (15 in. annually) is wholly inadequate in average years. Kansas is essentially an agricultural state. The crop of Indian corn is by far the largest and most valuable of the state. The mineral products mined consist of bituminous coal, salt, lead, and zinc. The principal industries are slaughtering and meat-packing, carried on mainly in Kansas City. The population in 1900 was 1,470,495 (52 per cent. males, and 48 per cent. females). Negroes formed 3.5 per cent. of the population, and foreign born 8 per cent. Settlement is very sparse in the W. Topeka is the capital. (2.) River of U.S.A., right branch of the Missouri, rises in the plains in E. Colorado in several branches—the Republican, Solomon, Saline, and Smoky Hill rivers; flows E. across Kansas, and joins the Mis-

Kant, IMMANUEL (1724-1804), one of the greatest of philosophers, whose system indeed is the central fact in modern philosophy, was born at Königsberg on April 22, 1724. He believed himself to be of Scottish extraction, but doubt has been thrown upon this. His life was very uneventful. In his sixteenth year he entered the University of Königsberg, where he was taught the then dominant philosophy of the Wolffian school. After six years at the university, he spent the next ten as private tutor in several noble families of the province, and in 1755 returned to the university as lecturer. It was not, however, till fifteen years later (in 1770) that he was promoted to a chair of philosophy. Never strong, he regulated his life by a very rigid and careful system. Precise times of rising, working, walking, and dining were scrupulously observed, and he disliked very much to have the routine of his day disturbed in the slightest degree. The only notable event of his later life was the conflict into which he was brought with the Prussian censorship by his (published) religious views, and as a result of which he for the time being submitted to be silenced. In the last years of his life his mental powers had already begun to show signs of weakness and decay.

It is usual to distinguish three periods in the development of Kant's thought—(1) The early period, in which he received and acquiesced in the current Leibniz-Wolffian type of philosophy; (2) a period of reaction, during the 'sixties, against this philosophy, in which he was influenced partly by the English empirical philosophy and ethics; and (3) finally the period in which he developed his own critical philosophy, and which may be said to begin with his inaugural dissertation as professor of philosophy in 1770, though it was not till eleven years after (in 1781) that he published his chief work, *The Critique of Pure Reason*, and his position in the meantime had undergone an important change.

The distinguishing feature of the critical philosophy is that it undertakes to investigate the faculty of reason or knowledge first of all, and to determine its limits before entering upon the work of systematic construction. Through the neglect of this preliminary investigation, a dogmatic philosophy of the Leibniz-Wolffian type essayed problems beyond the power of reason, and the result of such over-confident attempts is but to produce by their failures an equally extreme scepticism. The fundamental result of the critical philosophy,

on the other hand, is to establish a thorough-going distinction between the sphere of phenomena which are accessible to human knowledge, and that of *noumena*, or things-in-themselves, about which we can have no knowledge (strictly so called), not even that they exist. Kant accordingly rejects the old rational psychology, rational cosmology, and rational theology, all of which professed to attain a knowledge of super-phenomenal realities—*viz.* of the soul as an immortal substance, of the world as a finite or infinite whole, or finally of God as a perfect Being, Architect, and Creator of the world. But while a duly self-critical reason is compelled to resign its pretensions to deal with these high themes, its self-denial is not without reward. If, when it pretended to an unreal knowledge, it laid itself open to sceptical attacks, now, when it confines itself to the sphere of phenomena, it can establish the universal validity of its laws, and therefore the equal validity of the sciences based upon them. For phenomena, since they do not exist in themselves, but only in relation to mind, must conform to the laws of the mind's structure. And in the constructive part of his great work Kant exhibits by analysis the necessity of these essential laws of mind—first, the 'forms' of space and time, or fundamental truths of spatial and temporal relation, upon which the mathematical sciences depend; and second, the fundamental laws, such as that of causality, upon which the physical sciences depend. It was indeed one of Kant's main philosophical interests to explain and defend the high scientific claims of mathematical and physical knowledge against the questionings to which these were subjected by an empirical philosophy.

But the vindication of science was not the only fruit of reason's self-denial. A no less valuable benefit was the vindication of morality, and that religious faith which rests upon it. If Kant rejected the high but empty pretensions of the old rational theology, he seemed to himself to gain thereby that more real and accessible faith which springs from man's moral consciousness. If we do not and cannot know God as First Cause and Architect of the world, we can and must believe in Him as the moral Governor who will make the moral law finally prevail. But this religious faith depends upon the absolute validity of the moral law, and Kant sought no less strenuously to establish in his ethical works (*Groundwork of the Metaphysic of Ethics*, and *Critique of Practical Reason*) the

claims of a high and austere morality than he had formerly asserted the claims of science in his *Critique of Pure Reason*. At one time inclined to see, with the English moralists Shaftesbury and Hutcheson, the basis of morality in a moral sense or feeling, Kant later became convinced that the very slightest appeal to feeling was a danger to morality, and that the purity of ethics could be guaranteed only when reason alone gave the law. The only thing good without qualification is the good will—*i.e.* the will that gives itself in free submission to the moral law; and the moral law, which is reason's own law self-imposed, has but the one supreme commandment—to eliminate from our action every subjective or selfish motive, to follow no rule of action which we cannot will to be universally obeyed. Only a being who is free, able to rise above the pressure of motive and desire, can so will and act. Consequently we must postulate freedom of the will for man on the ground of his moral consciousness. 'I ought, therefore I can.' Now if science, which brings all its objects under the inexorable law of causal necessity, were indeed an account of things-in-themselves, freedom would be impossible. But science tells us only of phenomena, while man—who as a moral being is no mere phenomenon or part of nature, but a free agent in whom reason itself becomes practical—belongs with his moral consciousness to the higher noumenal world. Hence the same self-denial of reason, which sets strict bounds to knowledge, and opens to faith the higher world of morality and religion. In the later *Critique of Judgment* Kant goes some way towards reconciling the dualism of the two other critiques, but the fuller development of his suggestions was left for his idealistic successors.

The chief works of Kant above referred to are translated: *The Critique of Pure Reason* by Max Müller (1881) and by Meiklejohn (1852); the ethical works by Abbot—*Kant's Theory of Ethics* (1873); the *Critique of Judgment* by Bernard (1892). The fullest English account of Kant's philosophy is Caird's *Critical Philosophy* (2 vols.); a more compendious view is given in R. Adamson's *Philosophy of Kant* (1879); while the life of Kant is related in Wallace's *Kant* (1882, Philos. Classics); but perhaps the best general work is Paulsen's *Immanuel Kant, sein Leben und seine Lehre* (1898; Eng. trans. 1902). See also Mahaffy's *Kant's Critical Philosophy for English Readers* (1872-4).

Kantemir, ANTIOKH. See CANTEMIR.

Kanyev, or **KANEV**, *tn.*, Kiev gov., Russia, 60 m. S.E. of Kiev, on r. bk. of Dnieper. Kanyev is famous in Cossack history, and was the scene of many struggles between Russians, Poles, and Turks. Here the poet Shevchenko was born. Pop. (1897) 8,892.

Kaobang. See CAO-BANG.

Kaolin, or **CHINA CLAY**, is a hydrated aluminium silicate, and is a fine, almost impalpable powder of pure white colour, very soft, and slightly greasy to the touch; *h.* = 1, *sp. gr.* 2.2. It absorbs moisture readily, and when wet is plastic, so that it can be moulded in the solid. The chief sources of kaolin is decomposed granite. After being suspended in water, it is allowed to settle in shallow ponds, is then dug out in rectangular lumps, and dried over hot flues. It is used in the manufacture of porcelain and pottery (along with felspar, flint, and other substances), and in the preparation of sizes for smooth-faced printing-paper, such as is largely employed for illustrated books with process engravings. It is also used for sizing and loading cheap cotton goods. Much alum is prepared from kaolin by the action of strong sulphuric acid. Artificial ultramarine, copying-ink pencils, and many paints and water colours also contain kaolin. Being cheap, it serves largely also as an adulterant of farinaceous foods, dusting powders, and various other substances. The chief sources of kaolin are Cornwall (where the china-clay industry is important), Saxony, Limoges in France, and Thuringia in Germany. It is found also in China, Australia, the E. Indies, and the United States.

Kapellmeister, director of any orchestra or choir; originally director of the private band of a German prince.

Kapila, founder of the Sankhya system of Hindu philosophy, and reputed author of the *Sankhya-sutras*. When he lived is quite uncertain. For the tenets of his philosophy, see **SANKHYA**.

Kaposvar, chief *tn.* of co. Somogy, Hungary, 126 m. S.W. of Budapest. Pop. (1900) 17,352.

Kappel. See **CAPPEL**.

Kaproncza (Ger. *Kopreinitz*), *tn.*, Hungary, co. Belovar-Körös (Slavonia), 57 m. by rail, N.E. of Agram. Pop. (1900) 7,074.

Kapuas. See **BORNEO**.

Kapunda, *tn.* in Light co., S. Australia, 48 m. by rail N.N.E. of Adelaide, with copper mines and marble quarries. Pop. 2,000.

Kapurthala, feudatory state, Punjab, India, with an area of 598 sq. m., and pop. (1901) of 314,351. Kapurthala, the chief town, is 33 m. S.E. of Amritsar. Pop. (1901) 18,519.

Kara. (1.) Mining dist., S.E. Siberia, on a trib. of the Shilka, 300 m. E. of Chita. Its gold mines belong to the Czar. (2.) Sea, Russia, a branch of the Arctic Ocean, 170 m. by 300 m. Yugor Strait between the mainland and the island of Waigatz, Kara Strait (30 m. wide) between Waigatz and Novaya Zemlya, and Matochkin Shar, which divides Novaya Zemlya into two parts, are the entrances from the W. It is open for navigation from three to six weeks every year during July to September. (3.) River, 125 m. long, which forms the boundary between European and Asiatic Russia, falls into Kara Sea.

Kara-Balgassun. See **KARAKORUM**.

Karachev, *tn.*, Central Russia, gov. Orel, 55 m. by rail W. of Orel city. There are manufactures of rope and oil. Pop. (1897) 15,605.

Karachi, or **KURRACHEE**, *munic. tn. and cantonment, cap. of Sindh*, Bombay Presidency, India, on the delta of the Indus, 12 m. from the river's most westerly outlet, and 90 m. S.W. of Haidarabad. It is the terminus of railways which tap Punjab and Rajputana, and has an excellent harbour, covering 237½ ac., and protected by breakwaters. It has an active inland trade with Kashmir, Afghanistan, Turkestan, and Tibet. The shipping quarter is on the former island of Kiamari. Clifton on the S. is a seaside resort. Carpets and silverware are manufactured. The exports include hides, tallow, oil, cotton, wheat, and tea. In 1903 the total trade reached a value of £15,600,000. Pop. (1901) 116,663. See Baillie's *Kurrachee, Past, Present, and Future* (1896).

Karadagh. See **MONTENEGRO**.

Karaferia. See **VERIA**.

Kara-George, or **KARA-JÖRJ**. See **CZERNY, GEORGE**.

Kara-Hissar. See **AFIUM-KARA-HISSAR**.

Karaites, a Jewish sect who adhere to the strict letter of Scripture, and reject oral tradition and deprecate the Talmud. The schism arose at Bagdad about the middle of the 8th century A.D., under the leadership of Anan ben David. He led his adherents to Jerusalem, whence they were scattered at the time of the crusades. They are most numerous in S. Russia, especially the Crimea.

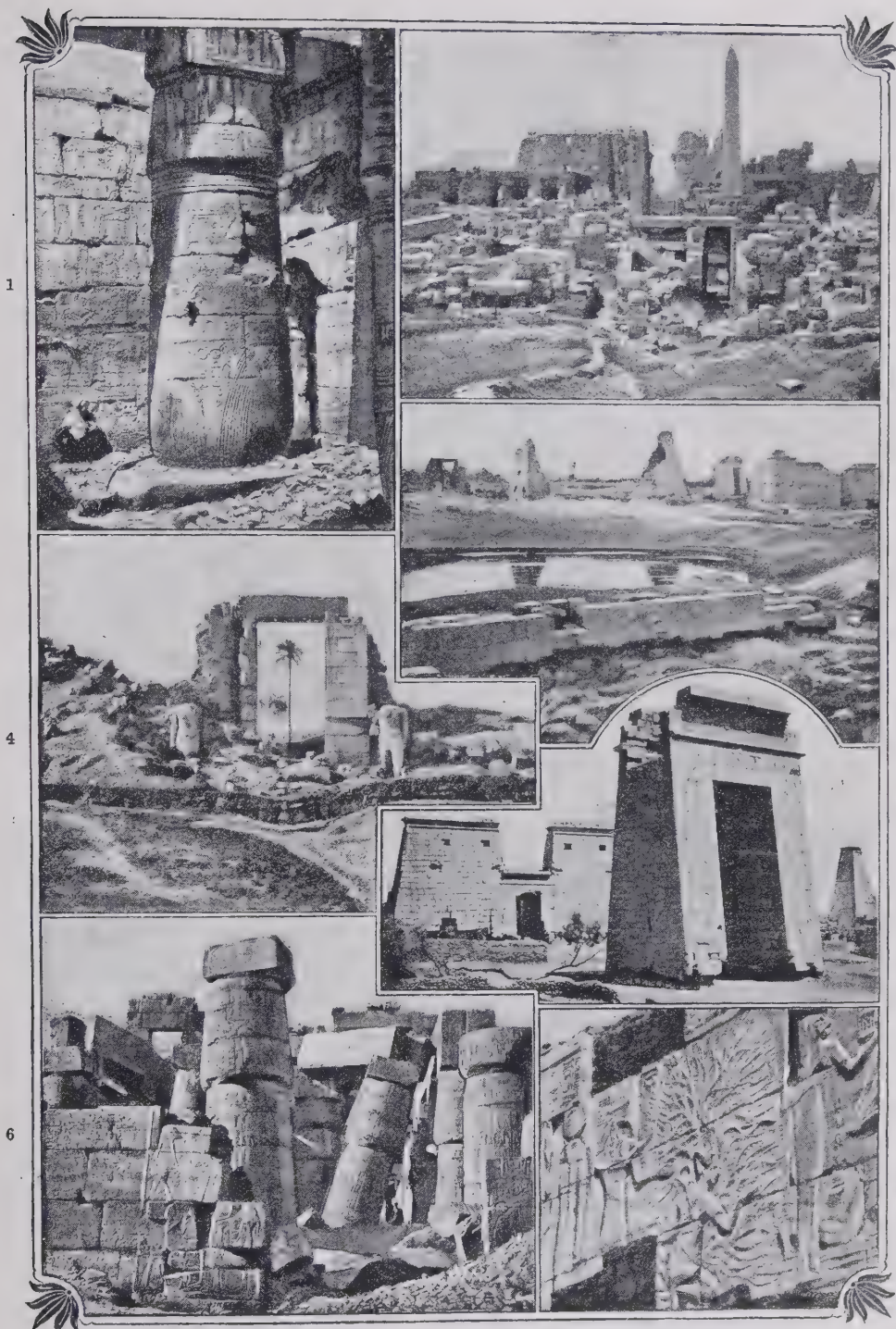
Kara-Kalpaks (i.e. 'Black Caps'), a Turkish tribe which forms a racial and geographical transition between Kirghiz to N. and Turkmans or Turcomans to S. They dwell chiefly in the Lower Oxus valley, especially in the Khiva region, where they perhaps number 125,000.

Karakoram Mts., a range of Central Asia, between E. (Chinese) Turkestan on the N. and India on the S.; connects the N.W. angle of the Tibetan plateau with the S.E. corner of the Pamir, and divides the basin of the Tarim from that of the Indus. It is separated from the Himalayas by a long depression (Pangong-Shayok-Indus). On the N. the Upper Yarkand-Daria valley, almost parallel to the Shayok-Indus, separates it from the W. Kuenlun. Its length is nearly 450 m. The pass of Karakoram, in lat. 35° 53' N., and long. 80° 18' E., is the principal commercial route connecting India and E. Turkestan. It is traversable throughout the year, though it is 18,500 ft. above the sea-level. In the central portion of the range are Dapsang and Godwin-Austen, the second highest peak in the world (28,278 ft.). Close by are other peaks, all over 25,300 ft., as well as the vast Baltoro glacier. West of these are the Muztagh pass and range and Mustagh-ata. Towards the W. end of the chain, in the Gilgit region, the Karakoram system culminates in Rakapushi, over 25,200 ft. See Sir W. M. Conway's *Climbing and Exploration in the Karakoram Himalayas* (1894).

Karakorum, properly **KARAKUREN** ('of the Mongols'), **HOLIN**, and **HOLA-HO-LIN** ('of the Chinese'), the ancient capital of the (Turkish) Uigur empire 7th-9th centuries A.D. (Kara-Balgassun), and of the Mongol empire in the middle of the 13th century, forms a vast extent of ruins in the valley of the Orkhon (N. Mongolia), principally grouped around two sites—(1) the Uigur capital, close to l. bk. of Orkhon, in 47° 28' N., and 102° 35' E.; and (2) the Mongol capital, founded by Ogodaï Khan in 1234, nearly 15 m. S.E. of the former, near r. bk. of Orkhon. Heikel and Radlov in 1890 and 1891 explored the ruins and discovered very valuable (Turkish, Mongol, Persian, Tibetan, Chinese) historical inscriptions of the 8th century, which have been interpreted in a remarkably able way by Professor V. Thomsen of Copenhagen.

Kara-kul, **GREAT**, lake of Central Asia, in the N. Pamir, S. of the Trans-Alai range, at 12,400 ft. above the sea, in lat. 39° N., and long. 73° 25' E. It is 15 m. by 12½ m., and its area is about 120 to 150 sq. m. It has a depth of 756 ft., and has no outlet.

Kara-kum, sandy desert of W. Asia, stretches from the Ust-Urt plateau near the Caspian, S.E. to the Afghan frontier, and has the Amu Daria on the N.E., and the Kopet-dagh (Persian frontier) on the S.W. It surrounds the oasis of Merv.



Ruins at Karnak.

1. Column in second court of Temple of Ramses III. 2. Great Temple from the south. 3. General view of the ruins from the lake. 4. Temple of Amenhotep, with the colossal statues of Ramses. 5. Pylons at the Temple of Ramses II. 6. Hypostyle Hall. 7. Great Temple—genealogical tree.

Karaman, or CARAMAN, tn., Asia Minor, near N. base of Mt. Taurus, 63 m. s.e. of Konia. Pop. 5,000.

Karamania, or CARAMANIA, the central plateau of Asia Minor, between lat. 36° 50' N.-39° 10' N., and long. 31°-36° E.

Karamzin, NIKOLAI MIKHAILOVITCH (1766-1826), Russian historian, was born near Simbirsk on the Volga. He made his reputation as a stylist with *Travels from Moscow* (Eng. trans., 3 vols. 1803), and in the same year he was appointed imperial historiographer. Then, too, he began his great *History of Russia* (11 vols. 1816-29; 6th ed. 1850-3), which he continued till his death, bringing it down to 1613. It is the first systematic history of Russia. Karamzin was one of the creators of modern Russian prose.

Karanja, tn., Amraoti dist., Berar, India, 36 m. s.w. of Amraoti; contains some ancient temples with striking carved woodwork. Pop. (1901) 16,535.

Karashahr, principal trading tn. of N. of E. or Chinese Turkistan, Central Asia, near N.W. shore of Baghrash-köl (40 m. by 15 m.). Pop. about 5,000.

Kara-su. See STRUMA.

Karasu-Bazar, tn. of the Crimea, S. Russia, gov. Taurida, 30 m. E.N.E. of Simpheropol. Pop. (1897) 12,966.

Karategin, dist. of Bokhara, Russian Central Asia, lying s. of Fergana; is drained to the s.w. by the Wakhsh or Surkh-ab, and includes an area of about 4,000 sq. m. Shut in by lofty mountains, it has a severe climate, but nevertheless produces mulberries, apricots, peaches, cherries, apples, and walnuts. The chief town is Garm or Harm, on the r. bk. of the Wakhsh. Pop. about 75,000, chiefly Aryan Tajiks, but including also 15,000 Kirghiz.

Karauli, or KEROWLEE, feudatory state in Rajputana, India, having an area of 1,242 sq. m. The country is hilly and rich in timber. Pop. (1901) 156,786, employed in agriculture and cattle-breeding. Sheepskin and furs are exported. The capital, Karauli, 55 m. s.w. of Bhartpur, is surrounded by a sandstone wall. Pop. (1901) 23,482.

Karczag, tn., Hungary, co. Jász-Nagykun-Szolnok, 37 m. s.w. of Debreczen. Pop. (1900) 20,886.

Karelia. See FINLAND.

Karenni, plateau (3,000-4,000 ft.) between Lower Burma and Siam. The country is divided into several petty states under the control of the British authorities. The country is well cultivated and fertile, and is inhabited by the tribe of Red Karens.

Karens, a tribe of semi-aborigines on the E. frontier of Burma and the W. border of Siam, and

in the Irawadi delta. Their prehistoric home seems to have been in S.W. China. Some of them have settled in the plains, and have adopted Buddhism; others are nomadic tribes, and retain their primitive nature-worship. See Wade's *Thesaurus of Karen Knowledge* (1847-50); Macmahon's *Karens of the Golden Chersonese* (1876); Smeaton's *The Loyal Karens of Burma* (1887).

Kargalik, or KARGHALIK, tn., E. or Chinese Turkistan, Central Asia, 35 m. s.e. of Yarkand. Pop. (1900) about 8,000.

Karikal, French settlement on Coromandel coast, Madras, India; has an area of 52 sq. m. Pop. over 70,000. The town and seaport of Karikal, 12 m. N. of Negapatam, exports rice, pottery, ground-nuts, and saffron. Pop. (1901) 13,783.

Kariot, or NIKARIA, the ancient Icaria, isl., Asiatic Turkey, one of the Sporades, 13 m. W. of Samos. Area, 103 sq. m. Cap. Phanari. Pop. 13,000.

Karli, renowned Chaitya cave temple, 25 m. s.e. of Bombay, India. It is cut in a rocky wall 850 ft. high. The interior, 126 ft. long, 4½ ft. broad, and 46 ft. high, is adorned with richly-carved columns.

Karlings. See CARLOVINGIANS.

Karloca (Ger. *Karlowitz*), tn. and archiepisc. (Greek Oriental) see of Hungary, co. Szerem, on r. bk. of Danube, 45 m. by rail N.W. of Belgrade, famous for the treaty signed here in 1699 between the Turks on the one side and Austria, Poland, Russia, and Venice on the other. It makes very good wine and plumbrandy (*slivovitsa*). Pop. (1900) 5,639.

Karlsbad, tn. and wat.-pl. of Bohemia, Austria, at the S. foot of the Erzgebirge, 116 m. W. by N. of Prague. The waters are warm (80°-136° F.) and alkaline-saline in quality. The season is at its height in June and July. The little town (1,225 ft. above sea-level) is squeezed into the narrow and romantic valley of the Tepl, and is surrounded by pine-clad mountains. Porcelain, goldsmiths' work, liqueur, needles, and ornaments (out of the petrefactions of the mineral water) are made. The waters were first used for bathing about 1520. Pop. (1900) 14,640; or, including the suburbs, 24,938.

Karlsburg, or GYULA-FEHÉRVÁR, fort. tn. and episc. see of Transylvania, Hungary, on the r. bk. of Maros, 33 m. W.N.W. of Hermannstadt. It produces wine, and has a cathedral (1443). Pop. (1900) 9,669.

Karlishamn, seapt. of Swedish co. of Karlskrona, 30 m. W. of Karlskrona. It has a fortified

harbour, navigation school, ship-building yard, and tobacco, leather, and spirits industries. Pop. (1901) 7,091.

Karlskrona, fort. seapt., on rocky isls. off S. coast of Sweden, cap. of co. of same name, 47 m. s.w. of Kalmar. It has ship-building yards, an arsenal, naval school, and hospital, and tobacco, hat, cloth, and match factories. Since 1680 it has been the chief station of the Swedish fleet. Pop. (1900) 23,955.

Karlsruhe, tn., Germany, cap. of grand-duchy of Baden, 34 m. by rail s.s.w. of Heidelberg, near the N. end of the Black Forest, 6 m. E. of the Rhine, on which it has its port of Maxau. The older parts of the town are laid out in the form of a fan, the streets radiating from the grand-ducal castle (1750-82). In 1853 the grand-duke founded here an academy of art. This, with a picture gallery and the exhibition of the Karlsruhe Art Association, have given the place some importance in the art history of Germany. The polytechnic was the first (1825) of its kind in Germany. The palace of the hereditary grand-duke, the architects' school, industrial art school and museum, cadet academy, conservatory of music, the polytechnic, figure amongst the chief features of interest. Of recent years Karlsruhe has become an industrial centre, producing railway engines and carriages, machinery, firearms and explosives, cigars, furniture, silver wares, leather, cement ware, beer, carpets, and perfumery. Pop. (1900) 97,185.

Karlstad, cap. and episc. see of Sweden, co. Vermland, on isl. of Thingvalla, at N. end of Lake Wener. It has been rebuilt since a fire in 1865, and manufactures machinery, tobacco, and matches. Here was signed, Sept. 23, 1905, the agreement dissolving the union of Norway and Sweden. Pop. (1900) 11,869.

Karlstadt. See KAROLYVAROS.

Karluk. See KODIAK.

Karma. See BUDDHISM.

Karmö, isl., W. coast of Norway, co. Stavanger, opposite Bukn Fjord, 107 sq. m. in area; has herring fisheries, and yields copper. Pop. 12,000.

Karnak. The great temple of Karnak in Egypt is situated about one and a half miles N. of the modern village of Luxor, on the r. bk. of the Nile, in 25° 50' N. lat. An avenue of krio-sphinxes leads up to the great gateway of Ptolemy Euergetes I. (247-222 B.C.), which opens on to the beautiful temple (recently excavated) of Chensu, dedicated by Ramses III. (20th dynasty). Slightly to the N.E. are the ruins of the main temple. The great propylæa

leading from one court to another are of magnificent proportions, the total breadth of the largest being 370 ft., and its height 142½ ft., while its depth is 60 ft. The processional hall is the largest of any. There is a central avenue of twelve columns 80 ft. high, with nine lines of smaller columns on either side—134 in all. The whole is carved and coloured. It was erected by Seti I. and finished by Ramses II. (19th dynasty). East of the hall is a court surrounded by Osiride figures in which are two red granite obelisks, one of them the second largest in the world; the other was erected by Queen Hatshepsu (18th dynasty). Other temples lying round the main building are those of Ptah and Hathor, of Amenhotep III., and of Horemheb.

Karnal, chief city, Karnal dist., Punjab, India, 7 m. from the r. bk. of the Jumna. It manufactures cotton cloth, blankets, and boots. Pop. (1901) 23,559. The district has an area of 2,440 sq. m., and a population (1901) of 883,225.

Karnatik, or **CARNATIC**, former political division of S. India, stretching 600 m. along the Coromandel coast, but now included in the governorship of Madras. During the 18th century it was the scene of the struggle for supremacy in India between Britain and France. It came under British administration in 1801.

Kärnthen, Austria. See **CARINTHIA**.

Karnul, or **KURNOOL**, cap. of Karnul dist., Madras, India, 88 m. N.E. of Bellary. Pop. (1901) 25,376. The district has an area of 7,514 sq. m., and population (1901) of 872,055.

Karolinenthal, tn., Bohemia, Austria, a suburb of Prague, lying between the Moldau and Zizkaberg. Pop. (1900) 21,094.

Károlyi, **ALOYS**, COUNT (1825-89), Austrian statesman, of Hungarian birth; was sent in 1859 as Austrian minister to Prussia, where he conducted the Schleswig-Holstein negotiations, and negotiated the preliminaries for the treaty of Prague (1866). In 1878 he was appointed ambassador in London.

Karolyvaros (Ger. *Karlstadt*), tn. and episc. see, Hungary, co. Zagrab (Croatia), 30 m. by rail s.w. of Zagrab (Agram). Pop. (1900) 5,991.

Karonga, station on the N.W. shore of Lake Nyasa, British Central Africa, at E. extremity of the Stevenson Road, between Lakes Nyasa and Tanganyika.

Karr, **JEAN BAPTISTE ALPHONSE** (1808-90), French novelist and journalist, born at Paris. His *Sous les Tilleuls* (1832), an

autobiographical romance, full of originality, freshness, and fantastic humour, brought him fame, and was followed by *Une Heure trop tard* (1833); *Fa dièze* (1834), which furnished Jules Sandeau and Emile Augier with the ideas for their comedy *La Pierre de Touche*; *Vendredi Soir* (1835); *Le Chemin le plus Court* (1836), containing autobiographical fragments; *Généviève* (1838); *Feu Bressier* (1848); and *Fort en Thème* (1853), a plea for educational reform. Karr became editor of *Le Figaro* in 1839, and the same year started *Les Guêpes* (1839-79), a monthly satirical journal. After 1848 he devoted himself to horticulture. His *Voyage autour de mon Jardin* (1845), *Lettres Ecrites de mon Jardin* (1853), *Le Crêdo du Jardinier* (1875) are charming works on gardening. His reminiscences, *Livre de Bord*, were published in 1879-80.

Karoo, the table-lands which form successive terraces between the sea shore and the high veld of the interior of Cape Colony. The Little Karroo is the first terrace, its N. buttress being the Zwarteberg. Northward of the Zwarteberg is the Great Karroo (average width 60 m.), bounded on the N. by the Nieuwveld Mts. In summer the Karroo is a desolate, arid plain, its only trees being a species of acacia. When the rains come 'the whole surface of the Karroo appears one immense ocean of dark green, spangled with flowers most brilliant and innumerable.' See H. A. Bryden's *Kloof and Karroo* (1889).

Kars. (1.) Russian prov. of Transcaucasia, ceded to Russia by Turkey in 1878. The country is elevated, being part of the Armenian plateau. Some of the peaks reach 10,000 ft. It is drained chiefly by the Kura. The climate is extreme. Agriculture and trade with Turkey are the chief occupations, though the Kurds are a pastoral people. Salt is obtained. Area, 7,308 sq. m. Pop. (1897) 292,498. (2.) Capital of above prov., 115 m. s.w. of Tiflis. The cathedral was built in the 11th century. Kars is strongly fortified, and has an ancient citadel. During the 9th and 10th centuries it was the capital of an independent Armenian principality. Fortified by the Sultan Amurath III. in 1579, it fell before the Russians under Paskevitch in 1828, but was restored. Kars was brilliantly defended by the Turks under the British general Williams for six months in 1855, but had finally to surrender to the Russians. It was again carried by storm by the Russians in 1877. Pop. (1897) 20,891.

Karsandas Mulji (1832-75), Indian journalist and social reformer, started the *Satyā Prakash* (Light of Truth), a Gujarati newspaper, in which he advocated female education and the re-marriage of Hindu widows. He was administrator of the native state of Limri.

Karshi, tn. and oasis, Bokhara, Russian Central Asia, 100 m. S.E. of Bokhara city. It produces tobacco. It was taken by the Russians in 1868. Pop. 25,000.

Karst, a name given to the limestone plateau which joins the E. Alps to the Dinaric Alps E. of Istria, but the term has been extended to include the whole of the porous limestone mountain system from the Laibach depression to the Morea (Greece). The surface contains many sinks or swallow-holes, called dolinas. Where the separating walls between the dolinas break down, we have various trough-line depressions known as uvalas (*Karstmulden*) or *polyes* (sunken fields). Karst phenomena, with sinks, cañons, and caverns, are found wherever soluble limestone exists in regions which are not too dry—e.g. in Derbyshire, and the Causses which border the central plateau of France.

Kartarpur, munic. tn., Jalandhar dist., Punjab, India, 40 m. S.E. of Amritsar; founded in 1588 by Guru Arjun, whose handsome residence and gardens are its chief feature. Pop. (1901) 10,840.

Kartikēya, the Hindu god of war, was the second son of Siva. The month of Kartika, part of November and December, is held sacred to him by the Sivaites.

Karun, riv. of W. Persia, rises in the Bakhtiari Mts., flows W. and S. past Shuster and Ahwaz, and joins the Shat-el-Arab at Mohammerah, 45 m. from the Persian Gulf. It is navigable as far as Shuster, though navigation is impeded at Ahwaz by rapids. It has been open to foreign commerce since 1888.

Karur, or **CAROOR**, munic. tn., Coimbatore dist., Madras, India, 44 m. N.W. of Trichinopoly, and near the Cauvery. It was the capital of the ancient kingdom of Chera or E. Kerala. Pop. (1901) 12,769.

Karwar, or **CARWAR**, seapt. and cap. of dist. of N. Kanara, Bombay, India, 54 m. S.E. of Goa. Formerly one of the principal harbours of the Bombay Presidency, its importance has been reduced since the opening of the S. Maratha railways. Total annual trade, £500,000. Pop. (1901) 16,847.

Karwin, tn., crown-land of Silesia, Austria, 65 m. S.W. of Cracow, in a coal-mining region. It has brewing and distilling. Pop. (1900) 14,328.

Karyokinesis. See CELL.

Kasai. See KASSAI.

Kasan. See KAZAN.

Kasanlik, or KAZANLIK, tn., E. Roumelia, Bulgaria; stands around rose gardens on the S. slope of the Balkans, 5 m. S. of the Shipka Pass, and yields attar (otto) of roses. Pop. (1893) 10,765.

Kassassin. See KASSASSIN.

Kasbin. See KAZVIN.

Kaschau (Hung. *Kassa*), tn. and episc. see, Hungary, co. Abauj-Torna, in the valley of the Hernád, 58 m. by rail N. by E. of Miskolcz. A remarkably fine cathedral (14th to 15th century), the museum for Upper Hungary, and mineral springs are the principal features. It has steam mills, and manufactures tobacco,

of Yarkand. It stands at the meeting-place of several important and ancient routes, and thus has considerable strategic, commercial, and social importance. It is composed of two parts—the Kuhna-shahr, or old town, and the Yanghi-shahr, or new town, 5 m. E. on the other side of the Kashgar-Daria. The old town, built about 1513, is encircled with a high clay wall. The governor's palace and a caravan-serai, both built by Yakub Bey (1864-77), are the chief buildings. Two miles to N. is the mosque of Hazrat Afak (d. 1693). The new town, built in or about 1838, is also fortified with massive clay walls. Its chief edifice is the palace of the *amban*, or Chinese governor. Adolph Schlagintweit,

pedotubes. The full complement of officers and men is about 1,000; the speed is 18 knots.

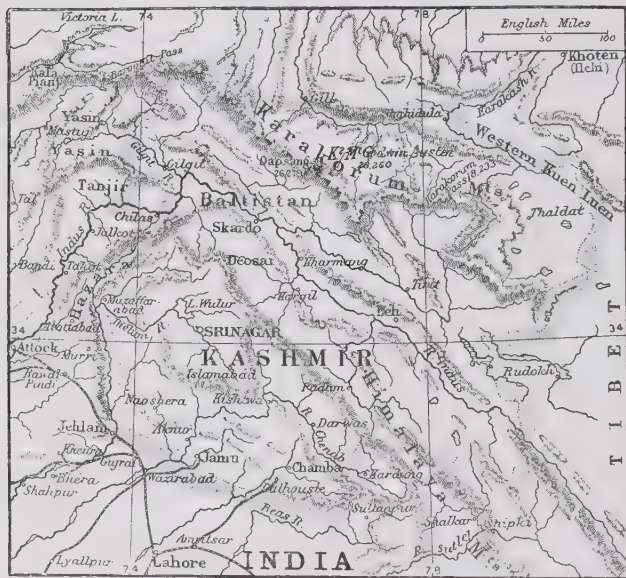
Kashinath Trimbak Telang (1850-93), Indian scholar and educationist, was called to the Indian bar (1872); appointed member of the council at Bombay (1884), and judge of the High Court (1889). He warmly supported the Ilbert bill, and served on the Education Commission. He wrote *Was the Rāmāyana copied from Homer?* (1873); *Free Trade from an Indian Point of View*; and translated the *Bhagavadgita* into English for Max-Müller (1879).

Kashkar. See KUNAR.

Kashmir and Jammu, also CASHMERE, feudatory state of India; is bounded on the N. by the Karakoram Mts., on the E. by Tibet, on the S. and W. by Punjab and the N.W. Frontier Province. Area, 81,000 sq. m. Except at the extreme S. (Jammu), the country is very mountainous. The Indus is the chief river. The soil is fairly fertile. Besides shawl-weaving, woollen fabrics, silkembroideries, gold and silver ornaments, and copper ware are manufactured. Kashmir enjoys a salubrious climate, varied and picturesque scenery, and a good supply of game. The capital is Srinagar. At one time *Nagas* (serpent-worshippers), the Kashmiris came under Buddhist influence about 245 B.C., and the subsequent corruption and decay of Buddhism paved the way for Hinduism. With the Mogul (Mongol) invasion the country passed into the possession of Afghanistan, and Mohammedanism became paramount, and is still the faith professed by the bulk of the population. In 1846, in return for his assistance, Gholab Singh, chief of Jammu, was allowed by the British to purchase Kashmir, and received the title of Maharajah. The country is, to all intents and purposes, a 'buffer' state, though subject to British control. Pop. (1901) 2,905,578 (1,542,057 males, 1,363,521 females). See Bellw's *Kashmir and Kashgar* (1875); Wakefield's *The Happy Valley*, etc. (1879); Eckenstein's *The Karakorams and Kashmir* (1896); Neve's *Picturesque Kashmir* (1900); and Wardle's *Kashmir, its Silk Industries*, etc. (1905).

Kashoubish, a Slav dialect, a branch of Wendish, spoken by nearly a quarter of a million of people in Pomerania. The name Kassubenland is applied to the country between the Persante and the Vistula, Kolberg being the capital.

Kasimbazar, or COSSIMBAZAR, decayed tn., Murshidabad dist., Bengal, India, once the seat of one of the great emporiums of Bengal. Its site is now a swamp.



Kashmir.

machinery, furniture, textiles. One of the chief national strongholds, it was captured by the Austrians in 1848. Pop. (1900) 35,586.

Kasganj, munic. tn., Etah dist., United Provinces, India, 60 m. S.W. of Bareilly. Pop. (1901) 19,686.

Kashan, tn., Kashan prov., Persia, 95 m. N.W. of Ispahan, and on route between Teheran and Ispahan. It manufactures silks, satins, brocades, copper ware, glazed tiles, and carpets. An earthquake in 1895 caused great destruction. Pop. 30,000.

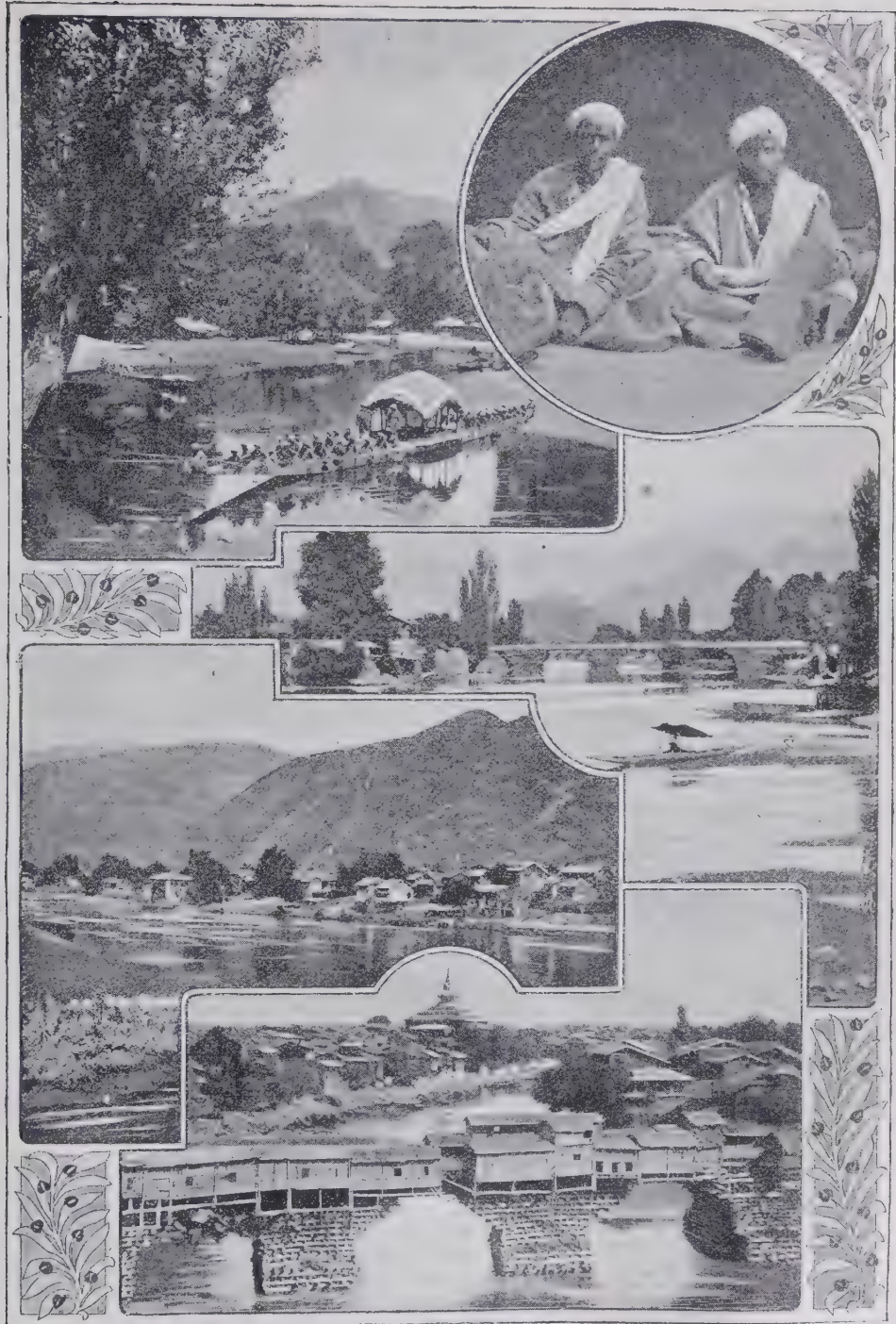
Kashgar, chief tn. of E. Turkestan, on the Kashgar-Daria or Kizil-su, one of the head-streams of the Tarim, nearly 100 m. N.W.

of the European traveller, was murdered here (1857). Pop. 40,000 to 50,000.

Kashgar-Daria. See TARIM.

Kashgaria, a name used in the wider sense for Chinese Turkestan or Sin-kiang, and in the narrower sense for a district in its W. extremity, including a population of about 120,000 people.

Kashima and Katori, two first-class battleships of the Japanese navy. The first was launched at Elswick, March 1905, and the second at Barrow, July 1905. They are sister-ships, having the same displacement and armament. The displacement is over 16,000 tons, and each carries four 12-in., four 10-in., ten 6-in., as well as smaller guns, and has five tor-



Scenes in Kashmir.

1. Maharajah's boat. 2. Cloth merchants. 3. Near Srinagar. 4. Baramulla, on Jhelum River. 5. Srinagar.
(Photos by Frith.)

Kasimov, tn., Ryazan gov., 90 m. E.N.E. of Ryazan city, Central Russia, on l. bk. of Oka. Tanneries, rope-making, farriery, and the manufacture of sheepskins, goats-hair garments, leather materials, and earthenware, are the chief industries. From 1452 till 1677 it was the capital of a Tartar principality. Pop. (1897) 13,545.

Kasipur, munic. tn., Tarai dist., United Provinces, India, 75 m. N.E. of Meerut. Identified as the former capital of the Govindana (Aryan) kingdom. Pilgrims resort to its many Hindu temples. Pop. (1901) 12,023.

Kaskaskia, vil. on r. bk. of riv. of same name, Illinois, U.S.A., near its junction with the Mississippi, 8 m. N.W. of Chester; was founded in 1680 by the French, and was the first capital of Illinois. Pop. (1900) 177.

Kasr-el-Kebir, tn., Morocco, 60 m. S. of Tangier. Oranges are largely grown, and wine is made. Here Sebastian of Portugal was defeated and slain (1578). Pop. 25,000.

Kassa. See KASCHAU.

Kassaba, or CASABA. (1.) Town, vilayet of Aidin, Asiatic Turkey, 50 m. S.E. of Konieh. Pop. 15,000. (2.) Town, Asia Minor. See CASABA.

Kassai, riv. of Central Africa, rises in Portuguese W. Africa, about 12° N. and 18° W., and flows E., then N., forming the boundary between Portuguese W. Africa and the Congo Free State for nearly 300 m. After a further course of over 500 m. to the N.W. and W.N.W. it is joined by the Kwango to form the Kwa. Wissmann explored it in 1885. It is navigable to the falls bearing his name.

Kassala, fort. tn., prov. of same name, Anglo-Egyptian Sudan, on a tributary of the Atbara, 230 m. E. of Khartum; is regaining its importance as a trading centre (ivory, gold dust, hides), which it lost after the Mahdi's revolt. It was taken by the Italians in 1894, and retaken by Osman Digna (1885) after a prolonged siege. Pop. 10,000.

Kassan, tn., Fergana, Russian Central Asia, 50 m. N.E. of Kokan. Here is the Sadpir cemetery, with ancient monuments and inscriptions, and an old castle. Pop. 10,000.

Kassassin, lock on the canal between Zagazig and Ismailia, Egypt, and 23 m. W. of the latter. Here in 1882 Arabi Pasha was twice defeated by the British.

Kassel, tn. and cap. of Prussian prov. of Hesse-Nassau, on the Fulda, 124 m. by rail N.E. of Frankfurt-on-the-Main. The principal square is flanked by the former palace of the electors (1769 and 1821) and a couple of museums, but the most imposing

buildings are those of the administration and the law courts (1876-80). Another fine new structure is the picture gallery. The palace in which Jerome, brother of Napoleon, lived when king of Westphalia, is now partly given up to the academy of the fine arts, and partly to military offices. The Karl Park (*Aue*) contains the Orangery palace, with famous marble baths. In Kassel lie buried Spohr, the musical composer, and Johannes von Müller. About 3 m. W. is the castle of Wilhelmshöhe, placed on a terrace of the Habichtswald, and surrounded by woods and fine gardens. Here Napoleon III. was detained (1870-1) after the battle of Sedan, and here the Emperor William II. and his family frequently spent part of the summer. The industries include iron works, engineering shops, factories for railway carriages, mathematical instruments, tobacco, small metal fittings, paper, pianofortes, also lithography and gardening. From 1806 to 1813 Kassel was the capital of the kingdom of Westphalia. Pop. (1900) 106,034.

Kastamuni, or KASTAMBUL, chief town of vilayet of same name, Asiatic Turkey, 76 m. S.W. by W. of Sinope; has manufactures of copper ware, cotton goods, and leather, and trades in mohair. Pop. 17,000.

Kasur, munic. tn., Lahore dist., Punjab, India, 32 m. S.E. of Lahore. Pop. (1901) 22,022.

Katanga, or GARENGANZE, country, Congo Free State, about 150 m. S.W. of Lake Moero; has copper mines. It was annexed to the Congo Free State in 1892.

Kater, HENRY (1777-1835), English physicist, born at Bristol; went (1799) to Madras, and did good service in trigonometrical surveying, but retired and devoted himself to science (1814). He proved the superiority of the Cassegrainian to the Gregorian telescope, invented the floating collimator, and determined the length of a seconds pendulum. He left writings on measures, balances, pendulums, and the Russian standards of length.

Katha, dist., Upper Burma, traversed by the Irawadi. Area, 6,994 sq. m. Pop. (1901) 176,223. Katha, cap. of the dist., is on the r. bk. of the Irawadi, 40 m. W. by S. of Bhamo.

Katharine. See CATHERINE.

Kathiawar, peninsula on W. coast of India, between Gulf of Cutch and Gulf of Cambay. It contains 187 feudatory states subject to Bombay. It is fertile and well watered. Cotton, the chief product, is exported. Area, 20,559 sq. m. Pop. (1901) 2,329,196. Off the S. coast is the Portuguese port of Diu.

Kathimein, or KADHIMEIN, tn., Asiatic Turkey, on the Tigris, 5 m. N.W. of Bagdad. Its mosque is a place of pilgrimage for Persians. Pop. 15,000.

Kathode. See ANODE and ELECTROLYSIS.

Kathode Stream. See VACUUM TUBES.

Katkov, MIKHAIL NIKIFOROVITCH (1820-87), Russian journalist, was born at Moscow; became (1845) professor of philosophy at Moscow University. He founded (1856) the *Russki Vestnik*, to advocate reform; but, alarmed by an insurrection in Poland, he became the apostle of the Russification of the whole empire. Through this and the *Moscow Gazette*, which he acquired in 1863, he gained great influence throughout Russia. In education he advocated classical humanitarian as opposed to natural science. It was in his paper that Tolstoy's genius first saw the light. See Liwoff's *Michel Katkoff* (in French, 1897).

Katmandu. See KHATMANDU.

Katomba, a third-class cruiser (2,575 tons) launched in 1889; one of the seven cruisers built for Australasian waters.

Katori, Japanese battleship. See KASHIMA.

Katrine, LOCH, in Stirlingshire and Perthshire, Scotland, 5 m. E. of Loch Lomond. It lies 364 ft. above sea-level, and has a maximum depth of 468 ft. It is 8 m. long, with an average breadth of about a mile. It discharges through Lochs Achray and Venachar to river Teith. Between the eastern end of the loch and Loch Achray lies the Trossachs. Above the loch towers to the S.E. Ben Venue (2,393 ft.), and to the N.E. Ben A'an (1,500 ft.). Since 1859 it has furnished Glasgow with its water supply. The surface was then raised five feet, and as a result the 'Silver Strand,' immortalized in the *Lady of the Lake*, was submerged, and Ellen's Isle diminished in extent. Near the head of the loch is the burying-ground of the clan Macgregor.

Katsena, tn. in N. of Sokoto, N. Nigeria, 100 m. E.S.E. of Wurno. Formerly an important town, it declined after a seven years' siege by the Fulahs at the beginning of the 19th century. Pop. 7,500.

Katsura, VISCOUNT (1847), Japanese statesman, was born in prov. Choshu. He studied military matters in Berlin, and from 1875-8 was military attaché at the Japanese embassy there. In 1886 he became vice-minister of the Japanese War Office, and helped to reform the army. He distinguished himself in the war between China and Japan, and was appointed war minister (1898) and prime minister (1901).

Kattegat, or CATTEGAT, sound between Sweden and Denmark, connecting the Skager Rack (N. Sea), through the Sound, the Great and Little Belts, with the Baltic. Length, 150 m.; breadth, from 40 to 70 m.

Kattimundoo, or CATTIMANDOO, a juice obtained from the *Euphorbia Cattimandoo*, a plant which flourishes in the north of the Deccan, India. The juice is analogous to gutta-percha, and, being of a highly adhesive nature, is employed as a cement. It is also used as a cure for rheumatism.

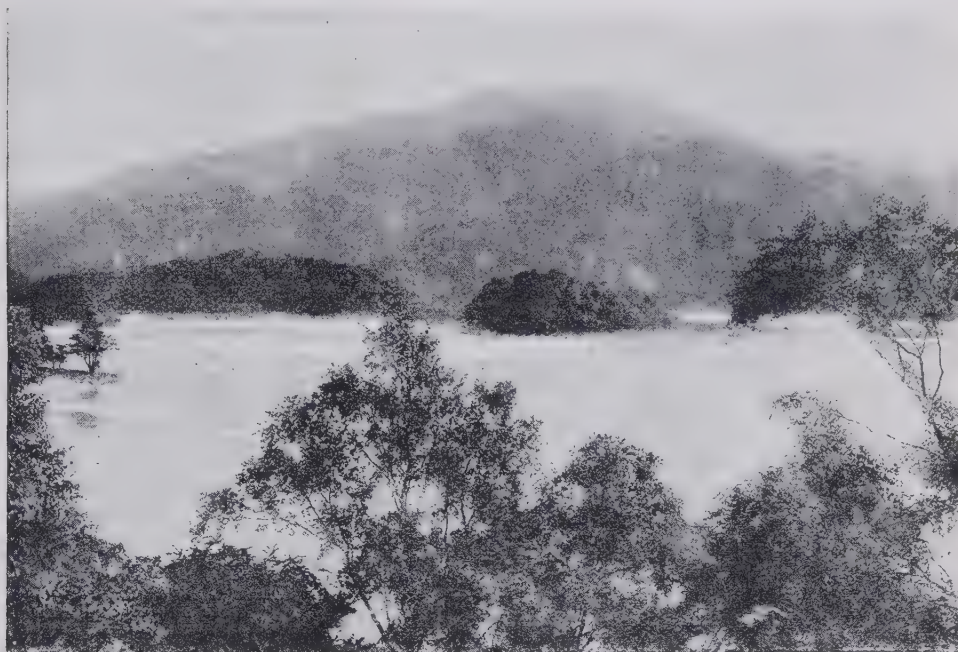
Kattowitz, tn., Prussian prov. of Silesia, 8 m. by rail s.e. of

Katyayana, a Sanskrit grammarian who is said to have lived in the Deccan in the 3rd century B.C. He was the author of the *Vārttikas*, a commentary, or, as some think, a hostile criticism, of the *Sātras*, or great grammar, of Pāṇini.

Katydid, a name applied to a group of American species of Locustidæ (green grasshoppers) from the 'song' of the male, which has been syllabled as 'Katy-did, O-she-did, Katy-did-she-did.' The females answer by a single sharp 'chirp,' produced by a sudden jerk of the wings. The katydids sing with great persistency, sometimes both by day

Kaufbeuren, tn., Bavaria, 35 m. s.w. of Augsburg; has manufactures of yarn, cotton, cloth, and machinery. Pop. (1900) 8,361.

Kauffmann, ANGELICA (1741-1807), painter, was born at Coire in Switzerland. After studying in Italy, she travelled, with a reputation already made, to England. Here she executed numerous portraits of leading personages, one of the best being the Princess of Brunswick and her child, and was elected one of the first members of the Royal Academy. She finally married Zucchi (1781), a Venetian painter, and spent her last twenty-five years at Rome. The popularity



Loch Katrine, Ellen's Isle, and Ben Venue.

[Photo by G. W. Wilson & Co.]

Beuthen, and 7 m. from the Austrian frontier, with iron and other metal works, sawmills, brick works, etc. Pop. (1900) 31,738.

Katunga, tn., Nigeria, Central Africa, 81 m. s.w. of Boussa; is an important trading centre. Pop. 15,000.

Katwijk, tn., seaside resort, and fishing vil. of the Netherlands, prov. S. Holland, on North Sea, close to the mouth of the Old Rhine, and 5 m. n.w. of Leyden. The Rhine mouth became blocked with sand during a storm in the year 839, and so remained until 1807, when a canal was cut through the dunes. Pop. (1899) 8,164.

and by night, often ascending to the tops of trees and rivaling one another in their shrill singing. Examples are *Microcentrum retinerve* and *Cyrtophyllus concavus*.

Katzbach, riv., Prussian Silesia, flows n.e. past Liegnitz, and falls into the Oder below Parchwitz. Length, 35 m. On its banks, in 1813, the French, under Marshal Macdonald, were defeated by the Prussians under Blücher.

Kauai, one of the most northerly of the Hawaiian Is., 84 m. n.w. of Oahu. Its surface is mountainous. Area, 590 sq. m. Pop. (1900) 20,734.

Kaub. See CAUB.

of her work has largely and justly declined. See *Life* by G. de Rossi (1810).

Kaufmann, CONSTANTINE PETROVITCH (1818-82), Russian general, was born near Ivangorod, in Russian Poland; distinguished himself at the siege of Kars (1855). Appointed governor-general of Turkestan (1867), he seized Samarkand (1868), and Khiva (1873). Two years later he annexed Kokand to Russia.

Kaufmann Peak, highest point of the Trans-Alai range, and one of the loftiest (22,000 ft.) in the whole Tian-Shan system. It was named after Kaufmann, the Russian leader in the conquest of Central Asia.

Kaulbach, WILHELM VON (1805-74), German painter, was born at Arolsen, and becoming a pupil of Cornelius, he endeavoured to free fresco work from church tyranny by introducing mundane subjects. At Munich he decorated Duke Maximilian's palace with sixteen designs of Amor and Psyche; in 1834 he painted *The Battle of the Huns*; and in 1838 another colossal canvas, *The Destruction of Jerusalem*. In 1847 he became director of the Art Academy at Munich, and was then long engaged upon a series of six great frescoes for the vestibule of the new museum at Berlin. He also illustrated the works of Goethe and Shakespeare. See HANS MÜLLER'S *W. Kaulbach* (1892).

Kaunitz, WENZEL ANTON, PRINCE VON (1711-94), Austrian statesman and diplomatist, born at Vienna; was appointed by Maria Theresa minister plenipotentiary to the governor of the Netherlands. As ambassador to France (1750), he negotiated the secret alliance between that country and Austria; afterwards became chancellor of state and chancellor of Italy and the Netherlands. He was a trusted servant of Maria Theresa, and supported Joseph II. in his ecclesiastical reforms. He founded the Vienna Art School and one or more academies for the training of art pupils. See Life by Horneynr in *Der Oesterreichische Plutarch*, vol. vi., and by Beer (1872).

Kauri Pine (*Agathis australis*), a coniferous tree peculiar to New Zealand, and forming its most valuable tree. It attains a height of from 120 ft. to 180 ft., and a diameter of from 5 ft. to 12 ft. The wood is straight-grained, easily worked, and susceptible of a high polish, and is largely exported for use as ship masts, deck boards, furniture, and paving blocks. The tree yields a fine resin, kauri gum, used in varnish-making. The gum is mostly in a fossil state, and is found in the ground wherever kauri forests have stood.

Kava, or AVA, is a term applied both to a shrub, *Macropiper latifolium*, and to a drink prepared by native Polynesians from the shrub by chewing its root, adding water to the extract thus obtained, and fermenting it. The shrub has a succulent stem, and large cordate leaves.

Kavala. See CAVALLA.

Kavanagh, JULIA (1824-77). Irish authoress, was born at Thurles in Tipperary. She is the authoress of *Madeleine* (1848), descriptive of life in Auvergne; *Natalie* (1850), which deals with Norman scenes; *Daisy Burns* (1853), which was translated into French; and *Adèle* (1858).

Kaveri. See CAUVERY.

Kavirondo, dist. of Uganda, British E. Africa, lying along the N.E. shore of Victoria Nyanza; is generally level, well watered, and fertile. The natives are of two types, Bantu and Negro. Besides cultivating sem-sem, the Wa-Kavirondo are clever miners, smelters, and blacksmiths.

Kay (Fr. *Kei* or *Ke*), of the Arthurian legend, is King Arthur's foster-brother and seneschal, and is represented as a man of bitter and sarcastic tongue. In the *Brut*, after performing many deeds of prowess, he is slain in the war against the Romans. In the evolution of Arthurian legend Kay undergoes a change for the worse. In *Perceval li Gallois* he is represented as slaying Arthur's son, Lohot, and conspiring against



Kauri Pine (Agathis australis).

the king. In the romance of *Gawain and Kay* (preserved only in the Dutch *Lancelot*), he plots to drive Gawain from court. He is occasionally represented as uncle to the queen.

Kay, JOHN (fl. 1733-64), English inventor, was born at Walmersley, near Bury. He invented the extended lathe, the fly-shuttle (1733), and the card-making engine, which revolutionized the staple manufactures of England.

Kay, JOHN (1742-1826), Scottish painter and caricaturist, born near Dalkeith; is distinguished for his remarkable caricatures of Edinburgh celebrities and famous Scotsmen of his time. See *Kay's Portraits* (1837; 3rd ed. 1877). See Biographical Note prefixed to the *Portraits*.

Kayak, the long, narrow, decked skin canoe of the Eskimos. The *kayik* (*carique*) of the Bosphorus and the Yakut *kayik* are the same word, although applied to vessels of wood, some of them seven tons burden. The occupant of the Eskimo kayak wears a sealskin or sealgut coat, which, itself waterproof, is tightly laced all round to the sides of the circular hold after he is seated, making the canoe secure against the entrance of water. An average kayak measures: length, 17 ft. 9½ in.; greatest breadth, 1 ft. 11 in.; greatest girth, 4 ft. 8 in.; weight, 60 lbs. The name *bidarka* is given to the kayak by the western Eskimos. Less frequent, and apparently not known among the eastern Eskimos, is the kayak with two separate manholes or holds to seat two paddlers, one behind the other.

Kaye, SIR JOHN WILLIAM (1814-76), English military historian, was born probably at Acton, Middlesex. He succeeded (1857) John Stuart Mill as secretary in the Political and Secret Department of the India office, and retired in 1874. In 1844 he had founded *The Calcutta Review*. His best known works are the *History of the Sepoy War* (1857-58), *History of the War in Afghanistan* (1851), and *History of the Administration of the East India Company* (1853).

Kayes, cap. of French Senegambia-Niger, W. Africa, on the l. bk. of the Senegal and at the head of navigation, 460 m. S.E. of St. Louis; is strongly fortified. It is the starting-point of a railway which extends 82 m. to Bafoulabé, and is being extended to the Niger. Pop. 10,000.

Kay-Shuttleworth, SIR JAMES PHILLIPS (1804-77), founder of English popular education, and the system of school inspection by government, was born at Rochdale, Lancashire. A pamphlet which he published in 1832 on *The Moral and Physical Condition of the Working Classes Employed in the Cotton Manufacture in Manchester* led to the adoption by the local authority of measures tending to sanitary and educational reform. He also engaged in the Reform and Anti-Corn Law movements. In 1835 he was appointed assistant poor law commissioner, and four years later was transferred to the newly-created Education Department. He established at Battersea the first training college for teachers (1839-40). Between 1861-5 Sir James Kay-Shuttleworth acted as vice-chairman of the central relief committee of the Lancashire Cotton Famine Fund. During 1870-73 he served on the Royal Commission on Scientific Instruction and the Advancement of Science.

Kazan. (1.) Government of E. Russia, bordered on the w. by Nijni Novgorod. Area, 24,000 sq. m. It belongs to the basins of the Volga and the Kama; in the N. are many marshes. The chief minerals are iron and copper. Forests cover about one-third of the total area (32.6 per cent.), and there is a great export of wood, especially to Astrakhan and the steppe regions of the S. Forty-nine per cent. (49.6) of the land is cultivated, especially for cereals, hemp, flax, poppies, and a little tobacco. Gardening, bee-keeping, and fishing are progressive industries. The population (2,191,058 in 1897) comprises some 885,000 Russians, 680,000 Tartars, 480,000 Chuvashes, 113,000 Chere-missians, 26,000 Mordvins, 8,000 Votiaks, and 3,000 Meshtcheriaks. This region was the old home of the Bulgarians. The Bulgarian state was overthrown by the Mongols in 1232, and till 1437 formed part of the Golden Horde of the Kipchak (Comania). The old khanate of Kazan (1437-1552) comprised the modern governments of Kazan, Vyatka, Simbirs, Penza, and part of Perm. Kazan became Russian in 1552. (2.) Capital of above gov., stands 3 m. from the Volga. Its kremlin, or upper city, is surrounded by a stone wall. The principal industries are tanneries, breweries, and distilleries, leather and cloth works, iron and copper foundries, tallow, soap, candle, and sugar manufactories, and naphtha refineries. Kazan is a great river port, ranking next to Nijni Novgorod on the Volga. Pop. (1897) 131,508. See Turner-elli's *Kazan et ses habitants* (1841); and the publications of the Statistical Committee of Kazan government on the *Volga Towns and Villages* of the province (1892).

Kazanskaya, vil., prov. Don Cossacks, Russia, on l. bk. of riv. Don. 165 m. N.E. of Kamen-skaya. Pop. (1897) 16,970.

Kazbek, volcanic mt. (16,546 ft.) in the Caucasus, 25 m. S. of Vladikavkaz.

Kazembe, or CAZEMBE, vil., British Central Africa, S. of Lake Moero, and near the Luapula R.

Kazvin, or KASBIN, tn., Persia, cap. of prov. of same name, 90 m. W.N.W. of Teheran; manufactures cotton and ironware, and exports large quantities of raisins to Russia. Its breeds of camels and horses are celebrated. Pop. 35,000.

K.B., Knight of the Bath.

K.C., King's Counsel.

K.C.B., Knight Commander of the Bath.

K.C.H., Knight Commander of Order of Hanover.

K.C.I.E., Knight Commander of the Indian Empire.

K.C.M.G., Knight Commander of St. Michael and St. George.

K.C.S.I., Knight Commander of the Star of India.

K.C.V.O., Knight Commander of the Royal Victorian Order.

Kea. See NESTOR.

Kean, CHARLES JOHN (?1811-68), English actor, second son of Edmund Kean, was born probably at Waterford; made his first appearance upon the stage at Drury Lane (1827). A visit to America (1830-3) was very successful. In 1850 he became a co-lessee with Robert Keeley of the Princess's Theatre, London, and carried out a series of Shakespearean revivals until 1859. A tour round the world with his wife, Ellen Tree, was followed by a few performances in London in 1866. Charles Kean achieved great success in the rôles of Louis XI., Louis and Fabian dei Franchi in *The Corsican Brothers*, and Mephistopheles. In the great Shakespearean parts, however, he failed to challenge comparison with his father, save in some points of Hamlet and Richard III. See *Life* by J. W. Cole (1859), and W. Marston's *Some Recollections of our Recent Actors* (1888).

Kean, EDMUND (1787-1833), English actor. His first great success was made in the part of Shylock at Drury Lane (Jan. 26, 1814). Richard III., Othello, and Lear were other triumphs; and he also played Hamlet and Macbeth with convincing power. Overmastering passion, bitter cynicism, and the whole grim side of human nature found perfect expression in his acting. The rival of Kemble, he drew immense crowds, and made the fortune of Drury Lane Theatre. At the close of his engagement there he toured in America (1820). After his return to England, however, the divorce case of Cox v. Kean (1825) told heavily against his personal reputation. English disapproval was echoed by America on his second tour (1826). His habits of heavy drinking weakened him physically and mentally, and eventually he collapsed at Covent Garden Theatre, in the middle of *Othello* (1833). See *Lives* by Barry Cornwall (1835), F. W. Hawkins (1869), and J. F. Molloy (1888).

Keane, AUGUSTUS HENRY (1833), ethnologist and geographer, born at Cork, Ireland. From 1882 to 1888 he was professor of Hindustani at University College, London, and vice-president of the Anthropological Institute (1883-88). He has translated and edited numerous geographical, philological, and archaeological works; and his writings include *Ethnology* (1895); *Man, Past and Present* (2nd ed. 1899); *The Boer States* (1900); and *The Gold of Ophir* (1901).

Kearney, city, Nebraska, U.S.A., co. seat of Buffalo co., on Platte R., 180 m. W.S.W. of Omaha. Pop. (1900) 5,634.

Kearny, tn., Hudson co., New Jersey, U.S.A., on Passaic R., is a suburb of New York and Newark. It has manufactures of mining machinery, floorcloth, brass and white metal goods. Pop. 10,896.

Kearsarge, first-class battleship of U.S.A., displacement 11,540 tons, launched in 1898. A former United States ship of this name sank the famous Confederate privateer *Alabama* off Cherbourg on June 19, 1864.

Kearsley, par. and tn., Lancashire, England, 4 m. S.E. of Bolton. The chief industries are coal-mining, iron-founding, brick and tile and paper making, and cotton-spinning. Pop. (1901) 9,217.

Keary, ANNIE (1825-79), English novelist, born near Wetherby in Yorkshire. While looking after her brother's motherless children, she wrote *Little Wanderlin*. In 1858 she visited Egypt. Her best-known novel is *Castle Daly* (1875), in which she describes Irish life. She also wrote *Heroes of Asgard* (1857), *Early Egyptian History* (1861), and *A Doubting Heart* (1879). See *Memoirs of Annie Keary*, by E. Keary (1882).

Keats, JOHN (1795-1821), English poet, born in London. In this brief life—a 'mature' career of some five years or so—this humbly born cockney youth became first among all latter-day English poets as the poet of beauty—the foremost representative of that rarefied and controlled sensuousness which, rightly or wrongly, is considered pre-eminently Greek. Perhaps two-thirds of his poetry could be forfeited without serious loss to English literature. It is the superb remainder which gives him his high pre-eminence. In his first two books, the *Poems* of 1817 and *Endymion* of 1818, there is much that is immature in thought and style. Yet the latter volume contains the 'Hymn to Pan,' and the former the noble sonnet 'On First Looking into Chapman's Homer,' admittedly among the finest sonnets in the language. The superb remainder alluded to consists of a few odes, the fragmentary *Hyperion*, *Lamia*, *The Eve of St. Agnes*, a few sonnets, an incomparable ballad. Than the odes to Autumn, to the Nightingale, on a Grecian Urn, and to Melancholy, it would be impossible to find anything lovelier and so near the unattainable of perfection. The influence of Keats upon later English poetry has been almost incalculable; to him, for example, Tennyson and Rossetti turned as to an inexhaustible and ever-satis-

fying pure well of beauty. The sculptor's sense of form, the painter's dream of colour, the musician's rapt ecstasy in perfected sound, are all here. As to his brief life-record, for his desertion of hospital walking to his settling at Hampstead, for his hopeless love for Miss Brawne till (in 1820) his collapse in health, his residences and wanderings in the Isle of Wight, in Surrey, and in Scotland, and his departure with his artist friend Joseph Severn for Italy, for the last sad days of suffering in Rome to the noble requiem by Shelley in *Adonais*—with *Lycidus* and *In Memoriam*, the most beautiful of English threnodies—see *Life, Letters, and Literary Remains of John Keats*, by R. Monckton Milnes (2 vols. 1848; and subsequent editions); *Life*, etc., by H. Buxton Forman (1883), and *Letters of John Keats to Fanny Brawne*, edited by same (1878); *Keats in the Men of Letters Series* (1887), by Sidney Colvin; and *The Severn Memoirs* (1892), compiled and edited by William Sharp.

Kebbel, THOMAS EDWARD (1828), English author, the son of a Leicestershire clergyman, was appointed receiver of fines in the Treasury. Among his works are *Political Biography*—i.e. *English Statesmen since 1815* (1868); *Life of Crabbe* (1887); *Life of Lord Beaconsfield* (1888); *Sport and Nature* (1893); *The Agricultural Labourer* (1893).

Kebir. See KABIR.

Keble, JOHN (1792-1866), English divine and poet, was born at Fairford, Gloucestershire, and became fellow of Oriel (1811) and tutor (1818), and professor of poetry at Oxford (1831-41). *The Christian Year*, published anonymously in 1825, had been very gradually composed. In 1823 he returned to Fairford, to minister to poor parishes near Coln. It is from an assize sermon which he preached (1833) at Oxford, 'National Apostasy,' that Newman dates the start of the Tractarian movement. To the famous tracts Keble contributed four. In 1836 he accepted the living of Hursley, Hampshire. His interest in childhood is manifested in *Lyra Innocentium* (1846). This, though less popular than the *Christian Year*, is regarded by many as the finest fruit of his genius. The secession of Newman to Rome in 1845 profoundly saddened him. Among his other contributions to literature are his edition of *Hooker's Works* (1836); *Life of Bishop Wilson* (1863); a metrical version of the Psalms—*The Oxford Psalter* (1839). As a poet Keble is the spiritual successor of George Herbert; and like Herbert and Hooker, he was altogether without worldly ambition.

Keble College, Oxford (opened 1869), was erected in honour of the poet's memory, and to perpetuate his teachings. See *Memoirs*, by J. F. Moor (1866); *Memoir*, by Sir J. D. Coleridge (1869); and *Life*, by Locke (1893).

Kecskemet, tn., Hungary, co. Pest, 65 m. by rail S.E. of Budapest, with corn and cattle markets, and production of wine, fruit, tobacco, soap. Pop. (1900) 56,786.

Kedah, Malay state tributary to Siam, stretches 120 m. along the W. coast of the Malay Peninsula, and covers an area of 5,000 sq. m. Cap. Alor Star, or Kota Star. The chief exports consist of tin, rice, guano, and jungle products.

Kedge, or KEDGE ANCHOR, a small anchor used to keep a ship, when moored, clear of her bow anchor, especially to prevent her, when the tide turns, from getting her cable slack and fouling the flukes of the main anchor. A kedge is often used for warping or 'kedgeing' a ship from one part of a harbour to another, or in any narrow waterway.

Kedive. See KHEDIVE.

Keeler, JAMES EDWARD (1857-1900), American astronomer, was born at La Salle, Illinois; was appointed assistant to the Lick trustees in 1886, and began spectroscopic work at the Lick observatory in 1888. His detection of the radial motions of nebulae took place in 1890. Succeeding Langley as director of the Allegheny observatory in 1891, he confirmed spectroscopically, in 1895, Clerk-Maxwell's meteoric theory of the constitution of Saturn's rings. He accepted the directorship of the Lick observatory in 1898. He wrote *Spectroscopic Observations of Nebulae* (1894).

Keeley, MARY ANN (?1805-99), née GOWARD, English actress, born in Ipswich. She first appeared in London at the Lyceum (1825). In 1829 she married Robert Keeley. Abandoning singing, she devoted herself to the drama; won success as Smike in *Nicholas Nickleby* in 1838, still greater success as Jack Sheppard (1839), and finally played Nerissa with Macready (1842). Undertaking the management of the Lyceum (1842), after a brilliant career she retired in 1859. See her *Reminiscences* (1900).

Keeley, ROBERT (1793-1869), English comedian, born in London. He made his debut there (1818), and achieved success as Rumfit in Peake's *Duel* (1823), and in 1829 married Miss Goward, with whom he was constantly associated on the stage until her retirement in 1859. With Charles Keane he carried out a series of famous Shakespearean revivals

at the London Princess's Theatre (1850-9). He was an 'imitable little droll.' He retired finally in 1862.

Keelhauling, a punishment inflicted in the British navy during the 17th and 18th centuries. The offender was dragged from one side of the vessel to the other, beneath her keel, by means of ropes attached to the yardarms. In small craft culprits were hauled along the keelson, from stem to stern. The practice, said to have originated in the Dutch navy, was frequently fatal.

Keeling or Cocos Islands, group of about twenty atolls in the Indian Ocean, 700 m. S.W. of Sumatra; annexed by Britain in 1857. The principal productions are copra and cocoanuts. In 1836 Darwin visited the islands, and, as the result of his observations there, propounded his theory of the formation of coral reefs by subsidence. Sir J. Murray in 1888 sent Dr. Guppy to these islands; but he found no evidence to cause him to withdraw his objection to the Darwinian theory. Pop. (1902) 698.

Keene, city, New Hampshire, U.S.A., co. seat of Cheshire co., situated 42 m. S.W. of Concord. Manufactures wooden ware and furniture. Pop. (1900) 9,165.

Keene, CHARLES SAMUEL (1823-91), English humorous artist, was born at Hornsey, Middlesex. He began to draw for the *Illustrated London News* and *Punch* (1851). In 1864 he took Leech's place on *Punch*, and for twenty-five years contributed to its pages. He also illustrated Douglas Jerrold's *Curtain Lectures*. Keene holds a foremost place among British artists in black and white. A collection of his drawings, entitled *Our People*, appeared in 1881. See G. S. Layard's *Life and Letters of Charles Keene of 'Punch'* (1892).

Keep. See CASTLE.

Keeper. See SEAL.

Keewatin, dist. of Canada, lying N. of Manitoba and N.W. Ontario, and between Hudson Bay and Saskatchewan. It has a computed area of 756,000 sq. m., and is inhabited by a few Eskimos. It abounds with game, is believed to have vast mineral deposits, and is well wooded. It is traversed by the Saskatchewan, Churchill, and Nelson. Pop. (1901) 8,546.

Keffi, or EL KEFF (anc. *Sicca Veneris*), fort. tn., Tunis, Africa, 73 m. S.E. of Bona. Pop. (1896) 6,500.

Keffil, tn., N. Nigeria, 120 m. N.E. of Lokoja. Pop. 80,000.

Kehl, tn., grand-duchy of Baden, Germany, on R. Rhine, immediately opposite to Strassburg. Mostly rebuilt since 1870, it was made a river port in 1900. Pop. (1900) 3,008.

Kei, Kei, or Key Islands, an archipelago in E. Indies, s.w. of New Guinea, belonging to the Moluccas; consists of Great Kei, Little Kei, and smaller islands. Total area, 467 sq. m. Pop. 24,000. Principal products: bêche de mer, pepper, betel nuts, sago, palm oil, coconuts, and timber. The people are famous builders of native boats.

Keighley, munic. bor., W. Riding, Yorkshire, England, 17 m. W.N.W. of Leeds. It manufactures stuffs, machinery, tools, and carries on iron-founding. Pop. (1901) 41,565.

Keightley, Thomas (1789-1872), Irish kildarian, born at Newtown, Co. Kildare. He is chiefly known (apart from his *Fairy Mythology*, which he published anonymously in 1828) by his various historical manuals. These include *Outlines of History* (1829); *The Mythology of Ancient Greece and Italy* (1831); *History of England* (1837-9); *History of Greece* (1835); *History of Rome* (1836); *History of the Roman Empire* (1840); *History of India* (1846-7). He edited various of the Greek, Roman, and English classics, and wrote a *Life of Milton* (1855). His historical work was of some merit, though not of the importance he was apt to attach to it.

Keil, Karl Friedrich (1807-88), German exegete, was born at Oelsnitz, Saxony; in 1833 became *privat-docent* at Dorpat, and in 1838 professor. After twenty years he retired to Leipzig, where he died. Keil was a very prolific writer, but his commentaries, once widely popular, are now out of date. His principal works are *Einkleitung zu the O.T.* (3rd ed. 1873); *Biblische Archäologie* (1858-9); a long series of commentaries in alliance with Delitzsch (all trans. into English); and exegetical works on the Books of Maccabees, the four gospels, and the epistles of Peter, Jude, and to the Hebrews.

Keill, John (1671-1721), Scottish mathematician and physicist, was born at Edinburgh. When David Gregory was appointed to the chair of astronomy in Oxford, Keill followed him, and became lecturer in experimental philosophy, and in 1712 was appointed to the Savilian chair of astronomy. His *Introductio ad Veram Astronomiam* (1718) gives a complete and orderly history of the science. A previous work, *Introductio ad Veram Physicam* (1701), was much praised abroad as an excellent stepping-stone to Newton's *Principia*.

Keim, Theodor (1825-78), German New Testament critic, was born at Stuttgart, and became professor at Zürich, latterly at Giessen. His main title to fame

rests on his *Geschichte Jesu von Nazara* (1867-72; trans. by Ransom, *Hist. of Jesus of Nazareth*, 1876-83), a massive and learned work, reverential in tone, and manifesting rare imaginative power.

Kei River. See GREAT KEI RIVER.

Keith, tn., Banffshire, Scotland, 50 m. W. of Aberdeen; has distilleries, and manufactures tweeds, blankets, and agricultural implements. Pop. (1901) 4,753.

Keith. See MARISCHAL, EARL.

Keith, George Keith Elphinstone, Viscount (1746-1823), British admiral, born near Stirling. When in command of the *Warwick* (1778) he captured a Dutch ship of war of equal force, and in 1795 successfully reduced the Cape of Good Hope, and then captured a Dutch squadron in Saldanha Bay (1796). In 1800 he captured Genoa and Malta, and in 1801, having become an admiral, commanded the naval part of the expedition to Egypt. See *Life* by Alardyce (1882); *Account of the Family of Keith*, by P. Buchan (1828).

Keith, James Francis Edward (1696-1758), known as Marshal Keith, second son of William, ninth Earl Marischal, was born at Inverugie Castle, near Peterhead, Scotland. In 1715 he took part in Mar's rebellion at Sheriffmuir, and again in the expedition which failed at Glenshiel (1719). Then escaping to the Continent, he served for nine years in the Spanish army, but in 1728 transferred his services to Russia. In 1747, however, he took service under Frederick the Great, who created him field-marshal, and under whom he served in the Seven Years' war, falling at Hochkirch (1758). See *Fragment of a Memoir written by Himself, 1714-34* (1789; reprint, 1843); Carlyle's *Frederick the Great*; Varnhagen von Ense's *Life*, in German (1844); and a shorter German *Life* by Paczynski-Tenczyn (1889).

Keith-Falconer, Ion Grant Neville (1856-87), Arabic scholar, born at Edinburgh; studied at Cambridge, where he was for some years Hebrew lecturer, and in 1886 lord almoner's professor of Arabic. In 1885 he published a translation of the *Fables of Bidpai*. Keith-Falconer was, however, engrossed with the idea of mission work in a field where his knowledge of Arabic might be directly utilized, and in December 1886 he left England for Shaikh-Othman, a station some miles from Aden, where he died from fever on 6th May following.

Kekewich, Robert George (1854), British soldier, famous for his gallant defence of Kimberley during the Boer war (Oct. 1899 to Feb. 1900), for which he was pro-

moted major-general and given the C.B. Subsequently he beat off a fierce attack by Delarey upon his camp at Moedwill (Sept. 30, 1901), and repulsed Commandant Kemp at Rooiwal with heavy loss (April 11, 1902). Previous to the Boer war he served in the Malay Peninsula (1875-6), the Nile expedition (1884-5), and the operations near Suakin (Dec. 1888).

Kekulé, Friedrich August (1829-96), German chemist, was born at Darmstadt. He became lecturer at Heidelberg in 1856; professor of chemistry at Ghent in 1858, and at Bonn in 1867, where he remained till his death. Kekulé's work was almost entirely on organic chemistry, mainly centering on the constitution of carbon compounds, in particular of benzene; his theories in this respect were the foundation of the most far-reaching advances and discoveries. Kekulé was also a great teacher, and wrote an unfinished but model *Lehrbuch der organischen Chemie* (3 vols. 1861-7).

Kelantan, native state of Malay Peninsula, protected by the British government. It lies immediately s. of the Patani states; has an area of 7,000 sq. m., and population of from 200,000 to 600,000. Kelantan, the capital, has a population of 20,000. Exports tin, gold, pepper, and other spices, and jungle produce.

Kelat. See KHELAT.

Kelat-i-Nadiri, fortress, Khorassan prov., Persia, 60 m. N.E. of Meshed, near the frontier of Russian Turkestan.

Kelland, Philip (1808-79), mathematician, born at Dunster, Somerset, was appointed professor of mathematics in Edinburgh University (1838). He wrote *Theory of Heat* (1837), *The Elements of Algebra* (new ed. 1860), *Lectures on the Principles of Demonstrative Mathematics* (1843), *Algebra* (1861), *Lessons in Physics* (1872), and *Introduction to Quaternions* (1873).

Kellaways Rock, a subdivision of the Oxford clay, is a calcareous sandstone, often very rich in fossils. It is best seen in Somerset, Northampton, and Yorkshire, being well exposed near Scarborough. It is used to a limited extent for building purposes and for road-mending, and contains, among other fossils, *Ammonites Jason* and *Keplerites Calloviensis*.

Keller, Gottfried (1819-90), Swiss novelist, born at Glattfelden, near Zürich. The success of a volume of *Gedichte* (1846) gave him a definitive bent towards literature, and in 1854 he published the novel *Der grüne Heinrich* (new and improved ed. 1879 80; 29th ed. 1903). Then came *Die Leute von Seldwylt*.

(1856; enlarged ed. 1873-4; 36th ed. 1904), short tales of Zürich life. From 1861 to 1876 Keller was first secretary of the canton of Zürich. His later works were *Zürcher Novellen* (32nd ed. 1903), containing such excellent little stories as *Der Landvogt von Greifensee* and *Das Fährlein der sieben Aufrechten*; *Das Sünnedicht* (28th ed. 1903), a novel; and *Martin Salander*, another novel (1886; 24th ed. 1903). His *Gesammelte Werke* appeared in 11 vols. (1889-1904). See Bächtold's *Kellers Leben* (1892-6), and K. Freiligrath-Kroecker's *Gottfried Keller, a Selection of his Tales* (1891).

Keller, HELEN ADAMS (1880), an American girl, who, in spite of being deaf, dumb, and blind, is remarkable for her intellectual accomplishments. After acquiring reading and writing, and the use of the finger alphabet, she determined to learn to speak. For this purpose she entered a school in New York, and within a month could talk intelligibly. She published *The Story of my Life* in 1903.

Kellermann, FRANÇOIS CHRISTOPHE, DUC DE VALMY (1735-1820), French general, born at Rothenburg, Bavaria. In 1792 his stubborn artillery defence of Valmy demoralized the Prussian invasion. Created marshal and Duc de Valmy by Napoleon, he commanded the Rhenish reserves (1809 and 1812). After Napoleon's return from Elba he sided with the Bourbons.

Kellgren, JOHAN HENRIK (1751-95), Swedish poet, born at Floby in W. Gothland. Along with Lenngren he started at Stockholm (1778) *Stockholms Posten*, which speedily became the critical oracle of the capital. Gustavus III. made Kellgren his librarian (1780) and his private secretary (1785). His style is still regarded as classical, and his satires, especially *Mina Löjen*, are the best of their kind in Swedish literature. As a critic, a sort of Scandinavian Voltaire, he exercised, on the whole, a beneficial influence, delighting by his flashing, caustic wit and his graceful elegance. See *Samlade Skrifter* (1884-5).

Kellie, LAWRENCE (1862), English singer and composer, born in London; first sang publicly at Covent Garden promenade concerts (1886). Since then he has given concert recitals in London, Paris, and throughout the United Kingdom. Mr. Kellie has published some eighty songs and pianoforte pieces, among the former being *The City of Night*, *The Sleeping Tide*, *Love's Nocturne*, and *Over the Desert*.

Kellogg, CLARA LOUISE (1842), American singer, born at Sum-

terville, S. Carolina; first sang in opera at the New York Academy of Music (1864), where her Marguerite in Gounod's *Faust* achieved a great success. After performing in *Lucia di Lammermoor* and *The Barber of Seville*, she made her appearance in London (Nov. 2, 1867), and returned again in 1872 and 1879. In 1879

Kelly-Kenny, SIR THOMAS (1840), British soldier, commanded the 6th Division in the S. African war, and took part in the operations which resulted in Cronje's capture at Paardeberg. These involved the fighting of a fierce rearguard action at Klip Drift (Feb. 17, 1900), in which Kelly-Kenny



The 'Book of Kells'—first Page of St. Mark's Gospel.

she also sang at St. Petersburg and Vienna.

Kells, tn., co. Meath, Ireland, 9 m. w.n.w. of Navan. It has an old church tower (rebuilt 1578), a round tower, St. Columba's house, and three or four crosses. Kells was an archiepiscopal see from 807; the see was joined with Meath in the 13th century. The Book of Kells, a copy of the gospels, now preserved in Trinity College, Dublin, is most elaborately and exquisitely ornamented. Pop. (1901) 2,428.

inflicted considerable loss on Cronje's force. He also distinguished himself at Poplar Grove (March 7, 1900) and Driefontein (March 10), when the Boers were defeated by Lord Roberts. While still a lieutenant he served in the N. China campaign (1860), and was present at the action of Sinho and the taking of the Tangku and Taku forts. He also served in the Abyssinian war (1867-8). He was adjutant-general from 1901 until the abolition of the office in 1904. In 1905 he was promoted general.

Kelp is the ash obtained by burning seaweeds, that of most value being obtained from drift-weed, consisting of plants growing wholly below low tide, such as tangle (*Laminaria digitata* and *Laminaria stenophylla*). Although formerly it was the sodium carbonate that was most valued, of recent years it has been the potash and the iodine contents that have been the most desired; but owing to the discovery of other and cheaper sources of these substances, kelp has largely lost its value even in these respects, and its production has greatly fallen off. The seaweed is burned in shallow pits, the salts left melting into a coherent slag. The product contains roughly about 14 per cent. of potassium sulphate, 17 per cent. of potassium chloride, 14 per cent. of sodium chloride, 4 per cent. of sodium carbonate—the balance being insoluble matter, moisture, and traces of other salts, including sodium iodide, from which from 10 to 12 lbs. of iodine to the ton of kelp is obtained, an amount that would be far greater were more pains taken in burning the seaweed.

Kelpie, a being in Scottish tradition, sometimes described as having the appearance of a man, and in that guise wooing maidens; at other times resembling a shaggy horse. It is associated with the sea and with rivers, and other alternative names being 'tangie' and 'shelly-coat.' Hugh Miller's account of the river Conon kelpie, the water-spirit referred to in the *Heart of Midlothian* (ch. iii., footnote 1), and the Irish 'red man of the Boyne,' all represent a river genius who, on the approach of a person fated to be drowned in the river, arises out of the water and proclaims the victim's impending doom.

Kelsey Beds, estuarine or marine gravels, which are seen at Kelsey, near Hull, in England, and contain marine shells and mammalian bones. They are glacial, or more probably interglacial, in age.

Kelso, tn. in Roxburghshire, Scotland, 42 m. S.E. of Edinburgh, at the junction of the Tweed and the Teviot. The former is crossed by a fine bridge of five arches, erected by Rennie in 1803. Sir Walter Scott and the Ballantynes were school-fellows at the old grammar school adjoining the abbey, and Horatius Bonar, the hymn-writer, was minister for thirty years in the Free church. The main industries are coachbuilding, agricultural machinery making, fishing-tackle making, and milling. St. James's fair, associated with the ancient burgh of Roxburgh, on

the opposite side of the Tweed, is still held annually in August. The abbey, Early Pointed Gothic and Norman, founded by David I. in 1128, is now a ruin. It was almost destroyed in 1542, and in 1560 was wrecked by the reformers. The town itself was burned by Lord Dacre in 1522. Floors Castle, the seat of the dukes of Roxburgh, and Springwood Park, that of Sir George Douglas, are close to the town. Pop. (1901)—par. 4,525, tn. 4,008.

Kelt. See SALMON.

Kelts. See CELTS.

Kelung, seapt., Formosa, Japan, on N.E. coast; is connected by rail with Taiwan. The French bombarded it in 1884. Coal, rice, camphor, and ground-nut oil are exported. Pop. 10,000.

Kelvin, WILLIAM THOMSON, LORD (1824), was born at Belfast. After graduating as second wrangler and first Smith's prizeman at Cambridge (1845), he was appointed (1846) to the chair of natural philosophy in Glasgow University, a post he retained till 1899. His research work includes all branches of mathematical and practical physics. In heat, his principal work has been in extending thermodynamical principles—notably in devising a method of arriving at an absolute scale of temperature, in discovering the 'Joule-Thomson effect,' and in enunciating the principle of the dissipation of energy. In general physics, he has done much to apply mathematics as a means of expressing the relations of observed facts; and in particular he has worked out most fertile ideas as to the nature of the ether, of inertia, and the application of vortex motion to explain the properties of atoms. His principal work, however, is probably in the field of electricity and magnetism, the first fruit of which appeared in the paper he published in 1845 on the laws of electrostatics, and which was greatly developed in his researches on electrodynamics and submarine telegraphy. These theoretical investigations he applied to the Atlantic and other cables from 1857 to 1879, and used in his invention of innumerable instruments of the highest precision for the use both of the investigator and of the practical man. Among the best known of these appliances are the reflecting galvanometer, the siphon recorder, several forms of electrometer, the ampere balance, electrostatic voltmeter, and electric-supply meters. He has also taken much interest in navigation, and in this connection invented an improved form of mariner's compass and an invaluable sounding-machine, be-

sides working out methods for compass correction and for the investigation of tidal phenomena. In addition to three series of monographs—viz. (1) *Electrostatics and Magnetism* (ed. 1884), (2) *Mathematical and Physical Papers* (1882-4), and (3) *Popular Addresses*—he has also published *Baltimore Lectures on Molecular Dynamics and Wave Theory of Light* (1904), and, in collaboration with Prof. P. G. Tait, a *Treatise on Natural Philosophy* (1879-83). He was given a peerage in 1892. See Fitzgerald's *Lord Kelvin* (1899).

Kelvin's Replenisher. See ELECTROSTATIC MACHINES.

Kemble, ADELAIDE (?1814-79), English singer and author, daughter of Charles Kemble (1775-1854), born in London. She sang in grand-opera in Germany and at Paris (1837-8), and at Covent Garden, London (1841-2), being described by some critics as 'the greatest English vocalist of the century.' She retired in 1842. The best known of her graceful writings is *A Week in a French Country House* (1867).

Kemble, CHARLES (1775-1854), British actor, youngest brother of John Philip Kemble and Mrs. Siddons, was born at Brecon in Wales. He joined his famous brother at Drury Lane (1794), playing secondary parts. Charles's chief laurels were won in comedy. He was appointed examiner of plays (1836).

Kemble, FRANCES ANNE (1809-93), English actress and writer, known as Fanny Kemble, daughter of Charles Kemble, was born in London, and reluctantly joined the stage (1829), when her Juliet at Covent Garden proved an extraordinary success. While acting in America (1832-4) she married Pierce Butler, a Georgian planter; and except for brief appearances on the stage and as Shakespearean reader, she lived subsequently in retirement. She published poems, two plays, and six autobiographical works, the best known of which are *Records of a Girlhood* (1878), *Records of a Later Life* (1882), and *Further Records, 1848-83* (1890). See *Letters of Edward Fitzgerald to Fanny Kemble* (1895).

Kemble, JOHN MITCHELL (1807-57), English philologist and historian, son of Charles Kemble, born in London. He published the *Poem of Beowulf* (1837) with translation, notes, etc.; *Codex Diplomaticus Aevi Saxonici* (1839-48), containing some 1,400 early English documents; *A History of the Saxons in England* (1849); the *Gospel of St. Matthew in Anglo-Saxon and Northumbrian* (1856); and *Horæ Ferales* (post., 1863). He was also licensor of plays.

Kemble, JOHN PHILIP (1757-1823), English actor, was born at Prescott, Lancashire. He first played at Wolverhampton (1776), afterwards appearing at York and Dublin. In 1783 he surprised London by his novel and powerful performance of Hamlet at Drury Lane; after which he played leading tragic rôles (Macbeth, Coriolanus, Cato, Othello) for some years, with rapidly increasing reputation. He became manager of Drury Lane (1788-1802), and from 1803-8 manager and part owner of Covent Garden Theatre, when he ranked as England's greatest living tragic actor, as his sister, Mrs. Siddons, was the greatest actress. The O.P. ('Old Prices') riots occurred in 1809, in consequence of his having raised the admission rates to Covent Garden (rebuilt); but he speedily overcame his unpopularity by the magnificent acting of his riper years. He retired from the stage in 1817. See *Memoirs* by Boaden (1825), and Fitzgerald's *Account of the Kemble Family* (1871).

Kemp, GEORGE MEIKLE (1795-1844), Scottish architect, born at Moorfoot, Peebles; studied architecture while travelling as a journeyman carpenter through England and France. His best-known work is the beautiful Scott Monument in Edinburgh (1838). Kemp was drowned in the canal at Edinburgh before the completion of the monument. See *Biog. Sketch* by Bonnar (1892).

Kempen, tn., Rhine prov., Prussia, 7 m. N.W. of Krefeld; has manufactures of silk and velvet. It was the birthplace of Thomas à Kempis (1379). Pop. (1900) 6,319.

Kempenfielt, RICHARD (1718-82), British rear-admiral. He fought in Pocock's actions with D'Aché off Cuddalore, Negapatam, and Pondichery in India (1758 and 1759). In December 1781 he signaled himself by scattering a French convoy escorted by a powerful fleet, and capturing several merchantships. In 1782 he perished on board the *Royal George*, which capsized off Spithead. He invented a system of signalling, which was adopted and improved by Lord Howe.

Kempis, THOMAS A. (c. 1379-1471), religious writer, was born at Kempen, N.W. of Düsseldorf, in the diocese of Cologne. When twelve years of age he became a pupil of the 'Brotherhood of the Common Life' at Deventer, and came under the tuition of Florentius Radewijus, whose biography—that of a revered master—he afterwards wrote. Leaving the school of the 'Brotherhood,' he spent five years (1400-5) in the Augustinian house of Mt. St. Agnes, near Zwolle, in the Nether-

lands, of which his elder brother was prior. There, too, after a year of probation, he assumed the monastic dress (1406), and in 1413 was ordained priest. At Mt. St. Agnes he lived in sweet tranquillity till his death. Once he had occasion to travel to Windesheim, and in 1429 he, with the rest of the brethren, retired to Lunekerke, whence in 1431 he hastened to a convent near Arnheim, and there, for fourteen months, tenderly nursed his dying brother. Altogether his absences might amount to about three years out of seventy-two. Sub-prior (1425), a short time bursar, and again sub-prior (1448-71), he loved the quiet round of copying good books, writing tracts, and teaching novices, supplemented by solitary meditation. Besides the *Imitation*, Thomas is author of *Meditations on Christ's Life*, *The Soul's Soliloquy*, *Garden of Roses*, *Valley of Lilies*, *Lives*, *Tracts*, *Sermons*, *Letters*, and *Hymns*. He further wrote in a beautiful hand the Bible in 4 vols., a Mass book, the principal works of St. Bernard, and copies of his own works.

The influence of the spiritual and contemplative life of the Brotherhood is seen throughout his writings. It was a community spontaneously formed by Groot and Radewijus in the interest of the inner life of Christianity as distinguished from rigid scholasticism. Not the letter of the law but the spirit. 'Brothers of a common life of good will,' they were to help one another and all within their sphere of influence to live a life of unworldliness, self-denial, godliness. In 1386 they founded the monastery of Windesheim, which within thirty years gave origin to forty-five similar convents. The Brotherhood was no company of idlers. They diligently multiplied copies of the Bible and other books which they supplied for sale. They supported themselves by tilling the ground and playing handicrafts. Each brother took his weekly turn of housework, drawing water, fetching fuel, and attending to the kitchen. They took part in the work of the grammar schools at Deventer, and planted other schools—the one at Herzogenbusch having 1,200 pupils, and that at Zwolle having nearly 1,000. In the schools the gospels were made the foundation on which to superimpose the Acts, Paul's epistles, and the lives of the fathers.

The *Imitation* is a ripe product and interpretation of the life of the Brotherhood. In its own straitened, painful way the book yet reaches down, below all superficial distinctions, to cath-

olic humanity. Thomas derives all good from love; all evil from want of love. He also draws a very broad distinction between (external) knowledge and (inward) wisdom. He is far from disparaging books. 'A priest without holy books is like a soldier without arms, a bird without wings, a writer without pens.' The key to the right interpretation of anything is uprightness of heart. 'Were thy heart right, then were unto thee every creature a mirror of life and a book of holy doctrine.' The indispensable condition to book-learning is to be up to that level. 'To know the whole Bible by heart and the sayings of all philosophers avails naught without the love of God in the heart, in relation to which alone has anything any meaning.' The *Imitation* has thus appealed to the hearts of men so far apart from one another as Luther, Johnson, Leibniz, Lamartine, General Gordon, Comte, George Eliot, who have found in it a common meeting ground. Classical in substance, the book has also beauty of form, simplicity, transparency, repose, brevity, and rhythm. There is still a controversy as to the authorship of the *Imitation*, but the balance of opinion is in favour of Thomas. The book has gone through many thousands of editions, and has been translated into every civilized language and many barbarous dialects. The existing MSS. are counted at 400; six (all of the 15th century) are in the British Museum. The most ancient perfect MS. in Thomas's own hand is in the Bourgogne Library at Brussels; it is dated 1441. The Life of Thomas is given in the Nürenberg edition of his works (1494); also by Heribertus Rosweide (1616). There is an edition of his collected works by Sommalius (1759). Among the many English translations are the first rhythmic one (1889), Dean Stanhope's (1866), Bishop Goodwin's (1868), Benham's (1874), and C. Bigg's (1898). See also Bibliography in Wolfsgruber's *Gersen* (1880), and *Life* by Brewer (1676) and by Butler (1814).

Kempsey, chief tn., Macleay dist., on Macleay R., 280 m. N.E. of Sydney, N.S.W., Australia. Pop. (1901) 2,331.

Kempton, tn., Bavaria, prov. Schwaben, on the Iller, 81 m. by rail S.W. of Munich. Cottons, paper, wooden wares, machinery, and hosiery are manufactured. The abbey was founded in 773; the abbot in 1360 was made a prince of the empire. Here in 1796 the French defeated the Austrians. Pop. (1900) 18,864.

Kempton Park. See RACE MEETINGS.

Ken, THOMAS (1637-1711), English prelate and hymn-writer, was born at one of the Berkhamsteads, Hertfordshire; became rector of Little Easton, Essex (1663-5), and of Brightstone, Isle of Wight (1667-9). Thereafter, till 1672, he was a prebend at Winchester, and rector at E. Woodhay, Hampshire. In 1679-80 he was appointed chaplain at the Hague to Mary, wife of William, Prince of Orange, and in 1683 chaplain with Lord Dartmouth at Tangier. Then he was nominated (1685) by Charles II. bishop of Bath and Wells. He attended both the king and the Duke of Monmouth in their last hours. Under James II. he was one of the 'seven bishops' sent to the Tower, and in 1691 was deprived of his see as a nonjuror. Ken wrote *Hymns for Morning, Evening, and Midnight* (1695); *Practice of Divine Love* (1685); *A Letter to Archbishop Tenison* (1695), reprinted in 1703 as *A Dutifull Letter from a Prelate to a Prelate*; collected *Works* (4 vols. 1721). See *Lives* by Hawkins (1713), Bowles (1830), Anderson (1851-4), and specially Dean Plumtre (1888-90).

Kenath, Biblical city of Manasseh beyond Jordan, called also Nobah (Num. 32:42). Nobah is noticed (Judg. 8:11) with Jophehah (Jubeihah) in Central Gilead; but the whole of Bashan belonged to Manasseh.

Kendal, or KIRKBY KENDAL, munic. bor., Westmorland, England, 9 m. S.E. of Lake Windermere. Near the town are the ruins of a castle noted as the birthplace of Queen Catherine Parr (1509). Manufactures include woollens, hosiery, and carpets, boots and shoes, fishhooks, gunpowder, and paper. Pop. (1901) 14,183.

Kendal, MARGARET GRIMSTON (1849), English actress, was born at Great Grimby, Lincolnshire, and made her debut in London as Ophelia (1865). In 1869 she married William Kendal, the actor. Continuing to appear at the Haymarket Theatre, she achieved a great success as Lillian Vavasour in *New Men and Old Acres* (1869). In 1875 she played under Mr. John Hare at the Court Theatre, under Mr. (now Sir Squire) Bancroft at the Prince of Wales's, and at the St. James's, of which her husband and Mr. John Hare were joint-managers (1879-88). She shared in her husband's successful American tours (1889-95). A series of articles entitled 'Dramatic Opinions,' contributed to *Murray's Magazine*, were from her pen.

Kendal, WILLIAM HUNTER, stage name of WILLIAM HUNTER GRIMSTON (1843), English actor, born in London. He gained his first experience in Glasgow (1861-

1866), and in 1866 appeared at the Haymarket Theatre, London, in *A Dangerous Friend*. Here he subsequently played Orlando, Romeo, Pygmalion, and other parts with success. After appearing at the Court Theatre and the Prince of Wales's, he joined Mr. John Hare in the management of the St. James's Theatre (1879-88). In 1869 he married Miss Margaret (Madge) Robertson, and with her toured in America from 1889-95, meeting with widespread appreciation.

Kendall, HENRY CLARENCE (1841-82), 'poet of the Australian bush,' was born in Ulladulla district, New South Wales. After being a clerk in the public service of New South Wales, he settled in 1869 in Melbourne as a journalist, but from 1873 held for a short time an inspectorship of forests in New South Wales. His principal poems—vigorous and sympathetically descriptive—are: *At Long Bay, Leaves from an Australian Forest* (1869), and *Songs from the Mountains* (1880). A volume of *Selections*, with Memoir, appeared in 1886. See also Sir Douglas Sladen's *Australian Poets* (1888).

Kendrapara, munic. tn., Cuttack dist., Bengal, India, 35 m. E. of Cuttack. Pop. (1901) 17,245.

Kenealy, EDWARD VAUGHAN HYDE (1819-80), barrister, born at Cork; called to the English bar (1847); became Q.C.; and in 1873, as counsel for the Tichborne claimant, was censured for eccentric and violent conduct. Having savagely attacked Chief-justice Cockburn and others in the *Englishman*, he was disbarred (1874). He was elected M.P. for Stoke (1875).

Keneh, or QINA, chief tn. of prov. of that name, Egypt, 414 m. S. of Cairo and 2½ m. from the r. bk. of the Nile. Porous jars and water-bottles are manufactured. Pop. 15,400. The province has an area of 544 sq. m., and population (1897) of 711,457.

Keng Tung. See SHAN STATES.

Kenia. See KENYA.

Kenilworth. (1.) Market tn., Warwickshire, England, 5 m. N. of Warwick. Ruins still survive of its castle, founded in the time of Henry I. The younger De Montfort held it for six months against Henry III., who issued the *Dictum de Kenilworth* (1266). Edward I. was imprisoned here. Queen Elizabeth bestowed the castle on Dudley, Earl of Leicester, who here entertained his sovereign with splendid pageants. (See Scott's *Kenilworth*.) It was taken by Cromwell and subsequently destroyed. Pop. (1901) 4,544. (2.) A suburb of Cape Town, Cape Colony. (3.) Model village for workmen of the De

Beers Company, Kimberley, Cape Colony.

Kennan, GEORGE (1845), American traveller, was born at Norwalk, Ohio; explored Central Siberia and Caucasia in the employ of the Russo-American Telegraph Company (1865-71). During 1885-6 he investigated the Siberian convict system. His impressions, published in the *Century Magazine* (1887-90), excited world-wide interest. He was expelled from Russia (July 1901). Mr. Kennan's chief works are *Tent Life in Siberia* (1870), *Siberia and the Exile System* (1891), *Campaigning in Cuba* (1898), and *The Tragedy of Pelée* (1902).

Kennebec, riv., Maine, U.S.A., rising in Moosehead Lake and flowing S. to the Atlantic. It is navigable to Augusta, 40 m. above its mouth. Its length is 150 m., and its drainage area 6,400 sq. m.

Kennebecasis, riv., Canada, New Brunswick, rises near the sources of the Petitcodiac, and flows S.W. into St. John's Harbour.

Kennedy, BENJAMIN HALL (1804-89), English schoolmaster, born near Birmingham; became assistant-master, Harrow (1830-6), and headmaster of Shrewsbury (1836-66); regius professor of Greek, Cambridge, and canon of Ely (1867). His chief publications were contributions to *Sabrine Corolla* (1850); *Curriculum Stili Latini* (1858); *Public School Latin Grammar* (6th ed. 1883); editions of Virgil (1876-81), the *Birds* of Aristophanes (1874), the *Agamemnon* of Æschylus (1878), and the *Œdipus Tyrannus* of Sophocles (1882); *Between Whales*, a collection of Greek, Latin, and English verse (1877); the *Ely Lectures* on the revised translation of the New Testament (1882); and *My old Playground Revisited* (1882).

Kennedy, a genus of Australian trailing or twining plants belonging to the order Leguminosæ. They bear pinnate, trifoliate leaves and papilionaceous flowers dark rose in colour. They are easily grown in the greenhouse in a light, peaty soil, provided they are given ample water in summer, and supports up which to climb.

Kennet, riv., S. of England, rises in the Wiltshire Downs S. of Swindon, and flows 44 m. S., E., and E.N.E. past Marlborough, Hungerford, and Newbury, to join the Thames on the r. bk. at Reading.

Kenneth I., MAC ALPIN (d. c. 860), king of Scots, son of Alpin, king of Dalriada; having conquered the Picts (846), became Ard-Righ, or ruler of the united monarchy. He established his chief seat at Scone, and six times invaded Northumbria.

Kenneth II. (d. 995), king of Scots, son of Malcolm I.; succeeded 971; warred against the Strathclyde Britons, overran Northumbria to the Tees, and established his sway over the Lothians. Kenneth II. was treacherously slain by Fenella, the daughter of a chief of Angus.

Kennicott, BENJAMIN (1718-83), English Biblical scholar, was born at Totnes, Devon, and laboured at Oxford till his death. In recognition of two dissertations—*On the Tree of Life* and *The Oblations of Cain and Abel*—he was made a fellow of Exeter College in 1747. Having designed a complete collation of the He-

the Chartists started from Kennington Common with their monster petition. The district returns one member to the House of Commons. Pop. nearly 100,000. Kennington Oval, s. of Vauxhall Bridge, is the famous cricket ground of the Surrey County Club.

Kenosha, city, Wisconsin, U.S.A., co. seat of Kenosha co., on the w. shore of Lake Michigan, 50 m. N. of Chicago. It produces tanned leather and machine-shop products. Pop. (1900) 11,606.

Kenosis, a Greek word employed by some theologians of the 4th century (e.g. Gregory Nazianzen and Cyril) to express the transaction alluded to in

A self-limitation in the exercise of divine functions is more agreeable to other scriptural representations than the actual, even if only temporary, cessation of them. See Dörner's *Christian Doctrine* (1880-2); Gifford's *Incarnation* (1897); Bruce's *Humiliation of Christ* (2nd ed. 1881); Hall's *Kenotic Theory* (1898).

Kensal Green, eccles. par. of London, England, 4 m. W.N.W. of Hyde Park Corner. It is noted for its cemetery (1832), where the Princess Sophia, the Duke of Cambridge, Sydney Smith, Anthony Trollope, Thomas Hood, Balfe, and others are buried. Pop. (1901) 29,159.



Kenilworth Castle.

(Photo by G. W. Wilson & Co.)

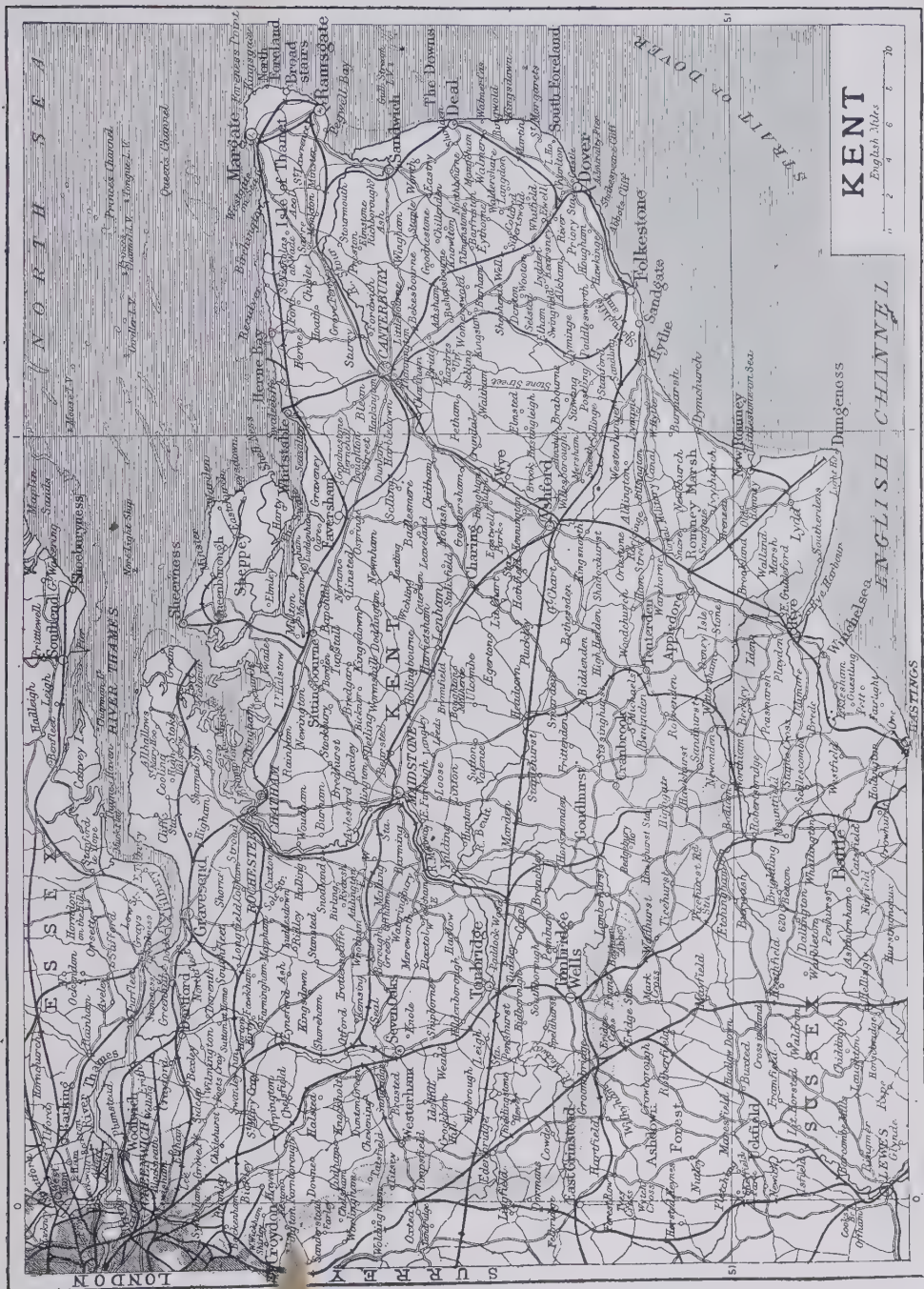
brew MSS. of the Old Testament, he published it as *Vetus Testamentum Hebraicum cum variis Lectionibus* (1776), for which he collated some 615 MSS. of the Hebrew Old Testament and sixteen of the Samaritan Pentateuch. In 1767 he was appointed Radcliffe librarian, and in 1770 was made canon of Christ Church, and was rector of Culham in Oxfordshire (1853-83). His work is, unfortunately, vitiated by his disregard of the Massoretic tradition, and his overestimate of the Samaritan Pentateuch. His labours were continued by De Rossi in the *Varie Lectiones Veteris Testamenti*.

Kennington, suburb of London, in Surrey, 2 m. s.s.w. of St. Paul's. On April 10, 1848,

Phil. 2:7—i.e. Christ's relinquishment of His proper and original glory and His taking the form of a servant. The kenosis would thus be but a particular aspect of the incarnation. The subject has provided matter for much controversy in ancient and modern times, the chief questions at issue relating to the degree of restraint imposed by the Redeemer upon Himself—e.g., whether the kenosis covers the limitation of Christ's knowledge implied in Mark 13:32, and of His fellowship with the Father as in Matt. 27:46; or whether the divine attributes, such as omnipotence and omniscience, were only hidden for a time; or, again, whether there was an actual cessation of them.

Kensington, parl. bor. and par., suburb of London, 4 m. w.s.w. of St. Paul's. Kensington Gardens, the picturesque grounds of Kensington Palace, communicate with Hyde Park. The Albert Memorial (1876) is a conspicuous object in the gardens, opposite the Royal Albert Hall. Other buildings of outstanding interest are St. Mary Abbot's Church, Christ Church, Brompton Oratory, the Imperial Institute, the Natural History Museum, the South Kensington Museum and School of Science and Art, and Holland House. It returns two members to the House of Commons. Pop. (1901) 176,623.

Kent, a British first-class cruiser (9,800 tons) launched in 1901.



KENT

English Channel

0 1 2 3 4 5 6 7 8 9 10

Scale in miles and kilometers

Kent, maritime co., England, bounded N. by the Thames, and S.E. and S. by the English Channel. In the N. is the Isle of Sheppey, and in N.E. the Isle of Thanet. Off the E. coast are the Downs, protected by the Goodwin Sands. Two parallel ranges of chalk hills traverse the county, terminating to the E. in the high cliffs of Dover, Folkestone, and Hythe. In the S. is the Weald, formerly thickly forested; and the south-eastern extremity is occupied by Romney and other marshes, now reclaimed. The county, called the 'Garden of England,' is well wooded and cultivated. The principal rivers are the Thames and Medway, on the N.; Stour, E.; and Rother, S.W. On the N. and E. the encroachments of the sea have destroyed several towns and villages, while on the S. deposits of sand and shingle have closed ports formerly flourishing, and added a considerable belt of land to the coast. Agriculture is a leading industry: the area under hops (Medway valley) is two-thirds, and that under small fruit one-third, of the total for England; and there are extensive orchards. The chalk downs afford excellent grazing for sheep, and the alluvial lands rich pasture for fattening stock. The oysters of Whitstable and other places are famous. Manufactures include paper, bricks, tiles, pottery, cement, beer, malt, and gunpowder; shipbuilding, manufacture of marine engines, and ironfounding. There are large government establishments at Woolwich, Sheerness, and Chatham. Ramsgate and Dover are harbours of refuge; the latter is the chief port for continental traffic; and there are numerous bathing resorts. The county returns eight members to Parliament. Canterbury, on the Medway, gives its title to the primate of England. Gavelkind is the characteristic Kentish tenure. There are many sites of Roman stations, remains of castles and churches, and among older relics is the cromlech called Kits Coty House. The proximity of Kent to the Continent early led to the organization of the Cinque Ports. Among later historical events may be noted the murder of Becket in Canterbury Cathedral and subsequent penance of Henry II., the rebellions of Wat Tyler and Jack Cade, the burning of Sandwich by the French in 1450, and the appearance of the Dutch in the Medway in 1667. Area (ancient co.) 1,555 sq. m. Pop. (1901) 1,351,849.

Kent, EDWARD AUGUSTUS, DUKE OF (1767-1820), fourth son of George III. and father of Queen Victoria; served with Grey's W. Indian expedition (1794). He was

created Duke of Kent and Strathern, and made commander-in-chief in N. America (1799). As governor of Gibraltar (1802), his drastic reforms caused a mutiny, and he was recalled.

Kent, JAMES (1763-1847), American jurist, born at Fredericksburgh, New York State; became professor of law at Columbia College (1793-6), recorder of New York (1797-8), judge of the state supreme court (1798-1804), chief-justice (1804-14), and chancellor of New York State (1814-23). He was then reappointed law professor at Columbia, and held the post till his death. His *Commentaries on American Law* (14th ed. 1896) is a standard work. He also wrote *Dissertations* (1795), and *A Course of English Reading* (1831). See *Memoirs of Chancellor Kent*, by his son, William Kent (1898).

Kent, WILLIAM CHARLES MARK (1823-1902)—pseudonym, Mark Rochester—English poet, miscellaneous writer, and journalist; editor of the *Sun* (1845-70) and the *Weekly Register* (1874-81); wrote memoirs on or edited the works of Burns (1874), Lamb (1875), Leigh Hunt (1888), Father Prout (1881), Bulwer-Lytton (1883 and 1898), Dickens (1884), and others. The *Seven Modern Wonders of the World* (1890) describes modern discoveries. His *Poems* (1870) include the once popular 'Long-fellow in England.'

Kentei or **KENTAI MOUNTAINS**, in N. Mongolia, near the Siberian frontier, about lat. 49° N., and between long. 106° 20' and 110° 20' E. The Kentei is divided into the Great Kentei, to the N., and the Little Kentei, to the S. Between the two, to the E., is the sacred mountain in which tradition places the tomb of Jenghiz Khan.

Kentia, a genus of tropical spineless palms with terminal pinnate leaves. *K. cistata*, almost the only species cultivated, grows to a height of eighty feet in its native country. It requires a soil containing abundance of peat, and abundance of water in the summer months. It may be propagated by means of seeds.

Kentigern, ST. (?518-603), bishop of Strathclyde. When driven away by King Morken, he took refuge with St. David in N. Wales, and became head of the monastery named after his disciple and successor, St. Asaph. Recalled by King Roderic, Kentigern first founded Glasgow Cathedral (St. Mungo). His day is January 13.

Kentish Fire, rhythmical hand-clapping (sometimes reinforced by stamping) adopted at political meetings, either to express approval or to interrupt the speaker; so called because heard in Kent during the anti-Catholic agitation (1828-9).

Kentish Knock, BATTLE OF THE, was fought 15 m. N.E. of the N. Foreland, on Sept. 28, 1652, between two Dutch fleets under Witte, De Witt, and De Ruyter, and the English fleet of Blake and Penn. The Dutch were beaten.

Kentish Rag, a rough, nodular, often quartzose limestone, occurring in the Hythe beds of the Lower Greensand in Kent. It is used as a building stone, and also for road mending, and has been in some places burnt for lime. Occasionally it contains an abundance of fossil sponges. A softer variety of this stone, which occurs in beds alternating with the rag, is known as 'hassock' or 'calk stone.'

Kentish Town, a suburb of London, 3 m. N.N.W. of St. Paul's; was in the 17th, 18th, and early 19th centuries notorious for highway robberies.

Kenton, cap. of Hardin co., Ohio, U.S.A., on the Scioto R., 59 m. N.N.W. of Columbus; manufactures hardware. Pop. (1900) 6,852.

Kent's Cavern, or **KENT'S HOLE**, hillside cave near Torquay, S.W. England; has yielded (1865-80) bones of the cave-lion, cave-hyæna, mammoth, woolly rhinoceros, wild bull, Irish elk, reindeer, grizzly bear, wild cat, horse, and beaver, intermingled with shells, ashes, charcoal, and human implements of stone and bone, the latter including two harpoon-heads made from reindeer's antler, several bone awls, and a bone needle. Archaeologists infer that the latter were made by people similar to the 'reindeer men' of the French caves. See British Association Reports, 1864-83; Dawkins's *Early Man in Britain* (1880); and Munro's *Prehistoric Problems* (1897).

Kentucky. (I.) One of the central states of U.S.A., with an area of 40,400 sq. m. It was admitted as a state in 1792. The surface is rolling, except in the eastern part, where it rises into the broken, wooded Alleghany plateau, the western portion of the Appalachian Mountain system. The Ohio flows along the northern boundary, and the Mississippi forms its western limit. The state is drained by the Big Sandy, the Kentucky, Licking, Cumberland, Tennessee, and other branches of the Ohio. The capital is Frankfort, and the largest city is Louisville, on the Ohio. The agricultural industry is the most prominent, the principal products being tobacco, Indian corn, wheat, oats, and hemp. Kentucky raises not less than from 30 to 50 per cent. of the tobacco of the whole country. The principal products of manufacturing

industry are tobacco, flour, lumber, and liquors. The mineral resources consist mainly of coal; in 1901 the amount mined was about 5,500,000 tons. This state contains the Mammoth and other great limestone caves. The population in 1900 was 2,147,174, of whom 50·8 per cent. were males, and 49·2 per cent. females. Foreign-born numbered 2·3 per cent., and negroes 13·3 per cent. (2.) River of Kentucky, U.S.A., a left-hand branch of the Ohio, rises in the Cumberland plateau in the E. part of the state, and flows N.W. to its junction with the Ohio. The length is 380 m., and the area of its drainage basin 7,425 sq. m. It is navigable to the Forks.

Kenya, extinct volcano, British E. Africa, immediately to the S. of the equator. It is cleft at the summit into two points, Batian (17,200 ft.) and Nelion (17,160 ft.)

grains' on cow's milk. Afterwards, when kept in closed vessels, the changed milk undergoes fermentation. It is a thickish liquid, refreshing, and very sustaining.

Kepler, JOHANN (1571-1630), German astronomer, was born at Weil, in Württemberg, and became in 1594 mathematical lecturer in the gymnasium at Gratz. His reputation was enhanced by the publication in 1596 of the *Mysterium Cosmographicum*, in which he attempted to establish a mystical geometry of the heavens. In October 1600 he removed to Prague as Tycho Brahe's assistant, and a year later succeeded him as imperial astronomer. He observed in 1604 the temporary star in Serpentarius, and published in 1606 a treatise connecting the apparition with the 'Fiery Triangle' of astrological import. His *Astronomia Nova* (1609) contained the laws that the planets

convex lenses. His *Stereometria* gives him a place among the founders of the infinitesimal calculus. His *De Cometis* (1619-20) treats of the great comets of 1607 and 1618. A complete edition of his *Opera* was published by Frisch (8 vols. 1858-72). See Brewster's *Lives of Galileo, Tycho Brahe, and Kepler* (8th ed. 1874); Müller's *Johannes Kepler* (1903); and Günther's *Johannes Kepler* (1905).

Kepler's Laws, of planetary motion. (1.) The planets describe ellipses about the sun whose centre is a focus. (2.) The radius vector of each planet sweeps over equal areas in equal times. (3.) The squares of the periodic times of any two planets are proportional to the cubes of the major axes of the orbits. From law (1) it follows that the force of attraction is as the inverse square of the distance; from law (2) that the sun's attraction holds the planets in their orbits, the resultant attraction being along the line between the planet and the sun. By law (3) the relative distances of the planets from the sun may be calculated. See Astrand's *Keplerscher Problems* (1890).

Keppel, AUGUSTUS VISCOUNT (1725-86), English admiral, second son of the second Earl of Albemarle, accompanied Anson round the world (1740-4). In 1759 he was in command of the *Valiant* at the battle of Quiberon Bay. In July 1778 he fought a much-criticised action off Brest. Serious differences of opinion occurred between the admiral and Sir Hugh Palliser, his second in command, and a scandal arose. Both officers were court-martialled (1779), but acquitted. Keppel was raised to the peerage (1782), and employed at the Admiralty as first lord.

Keppel, SIR HENRY (1809-1904), English admiral, son of fourth Earl of Albemarle. He distinguished himself in the China wars (1841-2), and, with Rajah Brooke, in attacks on piratical strongholds at the Straits Settlement (1844). He destroyed Chinese war-junks in Fat-shan Bay (1857), and commanded the naval brigade before Sebastopol (1855). He became admiral of the fleet (1875). He published *Expedition to Borneo* (1846), *A Visit to the Indian Archipelago* (1853), and *A Sailor's Life under Four Sovereigns* (1899). See West's *Memoir* (1905).

Ker, FAMILY OF, the surname of two noble families of Anglo-Norman lineage, Roxburgh and Lothian. They are believed to have come to Scotland in the 13th century, and settling in Roxburghshire, became the founders of the two families, the Kers of Fernihirst and the Kers of Cessford. Of the former the Marquis



Kentucky.

There are fifteen glaciers, most of them within an area of a square mile.

Kenyon, JOHN (1784-1856), philanthropist and minor poet, born in Jamaica. Among his literary friends were Rogers, Southey, Lamb, and chiefly the Brownings. From Weimar he brought personal reminiscences—unpublished—of Goethe, Schiller, Herder, and Wieland. He wrote *Rhymed Plea for Tolerance* (1833); *Poems* (1838); *A Day at Tivoli* (1849).

Keokuk, city (locally known as the 'Gate City'), Lee co., Iowa, U.S.A., on the Mississippi, 34 m. S.S.W. of Burlington. It is at the foot of the Des Moines rapids, which afford water power and are avoided by a navigable canal constructed in 1877. Pop. (1900) 14,641.

Kephr, the national beverage of the peoples of the Caucasus, is prepared by the action of a peculiar fungus known as 'kephir

travel in ellipses, and describe areas proportional to the times, and adumbrated a science of celestial physics. On the death in 1612 of the Emperor Rudolph II., Kepler took up his abode at Linz as professor of mathematics, while retaining his post at court. He published in 1618-21 an epitome of the Copernican astronomy, and in 1619 his *Harmonices Mundi, Libri V.*, in which he announced his third law, that the squares of the planetary periods are as the cubes of their distances from the sun. At Ulm, where he had sought a refuge from war troubles, the Rudolphine Tables appeared in 1627. They represented a reform of astronomy based upon Tycho's observations, and retained standard authority for a century. He wrote two works on optics, the *Paralipomena* to Vitellio (1604), and *Dioptrice* (1611; new ed. 1904), recommending in the latter the construction of telescopes with two

of Lothian is the chief male representative, and of the latter the Duke of Roxburghe is the head. Among the more celebrated members of the family were Robert Carr (the English form of the name), the favourite of James VI., afterwards Earl of Rochester; Sir Robert Ker, first Earl of Roxburghe, who accompanied James VI. into England, and was Lord Privy Seal in the reign of Charles I.; and John Ker, third Duke of Roxburghe, the well-known bibliophile.

Ker, JOHN (1819-86), Scottish divine, was born at Tweedsmuir, Peeblesshire. He made his mark as a preacher chiefly at Glasgow. He was professor of practical training in the United Presbyterian Hall from 1876 until his death, and was author of *Sermons* (1869-86), *The Psalms in History and Biography* (1886), *Lectures on the History of Preaching* (1888).

Kerak (anc. *Kir-Hareseth*, formerly cap. of Moab), tn. of Syria, 10 m. E. of the Dead Sea. It has a fort founded in 1131. Pop. 7,800.

Kerala, ancient kingdom of S. India, one of the divisions of the Dravida country. It corresponds with the British districts of Malabar and Canara.

Kerason, or KERASUND, tn., Asia Minor, on the Black Sea, 70 m. W. of Trebizond, has a fortress dating from Byzantine times. Cherry trees were first introduced into Italy by Lucullus from Kerason when it was the Greek colony of Kerasos. It exports hazel nuts. Pop. 9,500.

Keratin, a substance which occurs in the outer layers of the epidermis in vertebrates, as well as in such structures as the nails, hairs, and hoofs of mammals, the feathers of birds, the scales of reptiles and fishes, and so forth. Chemically it belongs to the group of the albuminoids—substances which give some, but not all, of the reactions of proteids. The special properties of keratin are its extreme insolubility and its high percentage of sulphur. A substance closely similar to keratin occurs in the sheath of nerve-fibres.

Kerbela, tn., Asiatic Turkey, 60 m. S.S.W. of Bagdad, W. of the Euphrates, near the ruins of Babylon. The tomb of Hussein, the son of Ali, is a place of pilgrimage for Shiite Mohammedans, who also carry their dead there for burial. The mosque which contains the tomb of Hussein has its domes and minarets plated with gold. Up to 1895 Kerbela was the headquarters of the chief priest of the Shiaks. Dates and cereals are exported, and sacred bricks and shrouds stamped with verses from the Koran are made. Pop. 65,000.

Kerch, tn., seapt., and fortress at the E. extremity of the Crimean peninsula (Taurida gov.), on the Strait of Kerch or Yenikale (20 m. broad and 22 m. long), which connects the Black Sea and the Sea of Azov. It contains an old Turkish citadel. Kerch represents the ancient *Panticapæum*. The Milesians founded a settlement here in the 6th century B.C. After the fall of Mithridates (63 B.C.) it was the capital of the quasi-independent kingdom of Bosphoros. During the Crimean war the fortress was destroyed by the allies, but has since been restored. Here have been found *chefs-d'œuvre* of Græco-Scythian art. In 1872 catacombs were discovered, with curious wall-paintings and sarcophagi, mostly assigned to the 4th century. Pop. (1897) 28,982. See L. Stephani's *Die Allerthümer von Kertsch* (1880); Macpherson's *Antiquities of Kertsch* (1857); Gilles's *Antiquités du Bosphore Cimmérien* (1854).

Kerguelen Land, or DESOLATION ISLAND, in Indian Ocean, 50° S. lat. and 70° E. long., discovered by Kerguelen Trémarec in 1772. Mountainous (Mt. Ross, 6,166 ft.) and glaciated, with deeply indented shores. It is uninhabited, but yields the peculiar Kerguelen cabbage (*Pringlea antiscorbutica*), the only species of its genus, natural order Cruciferae. The thick root-stock bears a large dense ball of leaves much valued by sailors as a vegetable and as a preventive of scurvy. The island was annexed by France in 1893. Area, about 1,500 sq. m.

Keriya, or KIRIA, tn. and oasis, E. or Chinese Turkestan, 100 m. E.S.E. of Khotan; has gold mines, and trades in silk, grapes, raisins, and tea. Pop. 1900) 12,000.

Kerki, fortified tn., Bokhara, Central Asia, 140 m. S.E. of city of Bokhara, on l. bk. of Amu Daria. Pop. 5,000, chiefly Uzbeks and Turkomans.

Kerkuk, or SHAHR-ZUL, tn., Asiatic Turkey, 90 m. S.E. of Mosul. Salt and alabaster are obtained, and naphtha is found. Pop. 30,000.

Kermadec Islands, group of volcanic islands in the Pacific, belonging (since 1887) to New Zealand, about 615 m. N.E. of Russell. Area some 12½ sq. m. Raoul, or Sunday, the largest, is 20 m. in circuit, mostly wooded, and inhabited by eight people.

Kerman, or KIRMAN. (1.) Province S. Persia (anc. *Caramania*), with Baluchistan on the E., and the Gulf of Oman on the S. Area, 60,000 sq. m. The desert of Kerman occupies the N. and N.E., and the remainder is mostly barren. Shawls are made. The climate is hot, dry, and unhealthy in the plains and valleys. Pop. about

600,000. (2.) Chief town of above province, 225 m. N. by E. of Bender Abbas, on the Persian Gulf. The place is fortified, and shawls and carpets are made. Pop. 70,000.

Kermanshah, or KIRMANSHAH, city and cap. of prov. Kermanshah, Persia, 270 m. S.W. of Teheran, is an important caravan centre on the road between Teheran and Bagdad. The chief exports are silk-yarns, opium, raw hides, gum, carpets, and spices. The imports in 1904-5 amounted to £836,949, and the exports for the same period to £215,508. Pop. 35,000.

Kermes Mineral, or amorphous sulphide of antimony, may be prepared by boiling a mixture of gray sulphide of antimony (crystalline) and sulphur in a solution of sodium carbonate, filtering whilst hot, and acidifying with sulphuric acid. The precipitate, of a bright red-brown colour, is digested in a solution of tartaric acid, to remove any trioxide that may have been formed, washed with water, and dried. Kermes mineral is now represented in pharmacy by sulphurated antimony, which is a mixture of sulphides and oxides of antimony.

Kernahan, COULSON (1858), English critic and writer, born at Ilfracombe; literary adviser (till 1905) to Messrs. Ward, Lock, and Co. He has written several problem novels. In *Dead Man's Diary* (1890) he relates an experience during absence from the body; in a *Book of Strange Sins* (1899) he analyzes, with narratives, 'suicide,' 'drunkenness,' 'soul-murder,' etc. He also wrote *The Child, the Wise Man, and the Devil* (1896); *God and the Ant* (1895); *Scoundrels and Co.* (1901); *The Face beyond the Door* (1904); *The Jackal, Visions, and A World without a Child* (1905).

Kernbaby, KERNABY, or HARVEST QUEEN. See HARVEST CUTS.

Kerner, ANDREAS JUSTINUS (1786-1862), German lyric poet, born at Ludwigsburg; became the intimate friend of Uhland, and practised medicine successively at Wildbad and Weinsberg. Kerner was one of the chief poets of the 'Swabian School,' and published *Reise-schatten von dem Schattenspieler Luchs* (1811), *Romantische Dichtung* (1817), *Der letzte Blütenstrauß* (1852), as well as a book on animal magnetism, *Die Scherin von Prevorst* (1829), which caused some stir. His poetry resembles the *Volkslieder*. In conjunction with Uhland and Schwab he issued *Der poetische Almanach* (1812), and *Der Deutsche Dichtervald* (1813). See Reinhard's *Justinus Kerner* (2nd ed. 1886).

Kerosene. See PETROLEUM.
Kéroualle, LOUISE RENÉE DE (1649-1734), mistress of Charles II. and mother of the first Duke of Richmond, was a native of Brittany. She was created Duchess of Portsmouth. She retired to France in 1688, after the death of Charles. See *Forneron's Louise de Kéroualle* (trans. by Mrs. Crawford, 1897).

Kerria, a monotypic genus of plants belonging to the order Rosaceae. *K. japonica* is a beau-

propagated by cuttings or division.

Kerry, maritime co., prov. Munster, Ireland. Its coast-line (Atlantic) is broken by two large peninsulas, by Dingle Bay and Kenmare R., and by Tralee, Bantry, and Ballinskelligs Bays, and Smerwick, Castlemaine, and Valentia harbours. The chief islands are the Blaskets, Valentia, and the Skelligs. The surface is low in the N., but in the main wild and mountainous, and

members to Parliament. The antiquities include Staigue Fort (one of the most remarkable in Ireland), Ogham stones, round towers, and ecclesiastical ruins. Area, 1,816 sq. m. Pop. (1901) 165,726.

Kersey, vil., near Hadleigh, Suffolk, England; gives its name to a light woollen cloth.

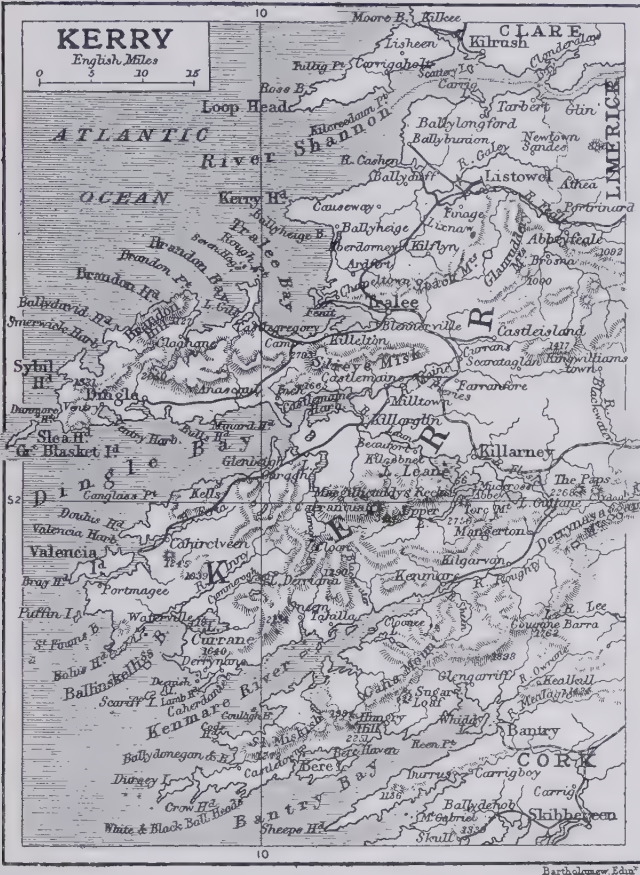
Kerulen. (1.) River of NEP. Mongolia, one of the head-streams of the Amur, flows mostly through the northern outskirts of the Gobi to its junction with the Argun or Khülar below the Dalai-nor or Kulun-nor. Length, nearly 600 m. (2.) Or KYRLUN, or URGO, N. Mongolia, over 350 m. E. of Urga, on the above river, in lat. 48° 3' N. and long. 114° 24' E. It has a celebrated Buddhist convent. Pop. (1871) 1,500.

Keshab Chandra Sen (1838-84), born in Calcutta; became the leader of the religious movement known as the Brahma Samaj. The changes he sought to introduce into native society excited the active hostility not only of orthodox Hindus, but of many members of the reform party. Establishing a weekly paper, the *Indian Mirror*, as the organ of his creed, he made a brief visit to England, where he was warmly welcomed by Unitarians. Subsequently he devoted his energies to the reform of the marriage laws; and the passing of the Native Marriage Act of 1872 was largely the result of his efforts.

Kesmark, ancient tn., Hungary, co. Szepes, at eastern foot of the Hohe Tatra, 78 m. by rail N.W. of Kaschau, with the museum of the Hungarian Carpathian Society, and manufactures of linen. Pop. (1900) 5,590.

Kesteven, PARTS of, a subdivision of Lincolnshire, forming its S.W. portion.

Kestrel, the name given to a group of species of the genus *Falco*, sometimes erected into a separate genus *Tinnunculus*, and distinguished by the bell-like note and the pattern of the plumage. Kestrels are chiefly brown, with dark spots, and have a broad sub-terminal black band on the tail; the females are darker and more distinctly barred than the males. In the common kestrel, or wind-hover (*F. tinnunculus*), the male has the anterior part of the upper surface bluish-gray, and the cere, legs, and feet yellow. The total length is about 14 in., while the wings are some 9½ in. long. The bird is very widely distributed over Europe, Asia, and Africa, and has even been taken in Massachusetts, though it is replaced in N. America by another species (*F. sparverius*). The kestrel feeds chiefly on mice or the larger insects. The name 'wind-hover' is given



tiful, hardy, deciduous shrub, growing to about six feet in height. It is popularly known as the Japanese rose, but must not be confounded with *Rosa rugosa*. It has thin leaves, unevenly serrated, and in summer and autumn bears abundance of large, solitary, terminal, yellow flowers, each with five sepals, five petals, and numerous stamens. It is easily grown in ordinary garden soil, preferring slight shade. It is most easily

very picturesque. The principal mountains are Macgillieuddy's Reeks, with Carrantuohill (3,410 ft.), the highest summit in Ireland, Mangerton (2,756 ft.), Brandon (3,127 ft.), Slieve Mish, Glendurru, Derrynasaggart, and Cahra Mts. Lakes include the celebrated Killarney Lakes. Oats and potatoes form the principal crops, and cattle are numerous, including the Kerry breed. Slate and flagstone are quarried at Valentia. Kerry returns four

on account of the habit of hanging in mid-air with the head against the wind. The lesser kestrel (*Falco cenchris*) is a southern form which occasionally strays to Britain. In both cases the eggs are mottled with red upon a light ground, but the mottlings are much paler in the lesser form. Neither builds a nest, the eggs being deposited in holes in cliffs or old buildings, or occasionally in the discarded nest of some other bird. The lesser kestrel is distinguished by its smaller size and its white instead of yellow claws.



Kestrel.

Keswick, tn., Cumberland, England, 18 m. s.w. of Penrith. The town is beautifully situated near the lower end of the lake, near Skiddaw, Saddleback, and other mountains. The lake has several islands, including the 'Floating Island,' formed of matted vegetation. South and south-east are Borrowdale and the Falls of Lodore. The town possesses a quaint town hall (1813), now used as public offices, a museum, and art gallery. Keswick is a favourite tourist centre, and in recent years has become noted for its annual Christian conference. It manufactures lead pencils, though the plumbago is no longer mined in Borrowdale. Southey resided here from 1804 till his death in 1843. Pop. (1901) 4,451.

Keszthely, tn., Zala co., Hungary, on w. shore of Lake Balaton, 60 m. s.w. of Stuhlweissenburg; has quarries of marble and basalt. Pop. (1900) 6,604.

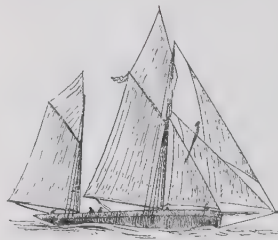
Ket, or **KETT**, ROBERT (d. 1549), English rebel, was a Norfolk tanner who headed a provincial rising in Edward VI.'s reign as a protest against the enclosure of commons. Ket successfully besieged Norwich (1549), but was overcome by the Earl of Warwick and hanged.

Ketch, in its older sense, a stoutly-built, two-masted craft, used especially as a bomb-vessel in the British navy. It was rigged almost exactly as a topsail schooner. The term is applied at the present day to a two-masted, fore-and-aft-rigged

craft, in which the mizzen is considerably shorter than the foremast. Thus the mizzen of a ketch is of a size intermediate between that of the mainsail of a fore-and-aft schooner and the jigger of a yawl.

Ketch, JACK (d. 1686), a headsmen who acquired notoriety as the clumsy executioner of Lord Russell (1683) and the Duke of Monmouth (1685). Subsequently a synonym for the executioner.

Ketchup, a kind of sauce, of which mushroom ketchup and walnut ketchup are perhaps the best known examples. To make mushroom ketchup, wipe, but do not wash or skin, some freshly gathered, fully ripe mushrooms, and place them in a jar with layers of salt between layers of mushrooms, and over the surface, allowing a total of six ounces of salt to the gallon of mushrooms. Cover the jar loosely with a cloth, and place it in a warm room until the next day. Crush the mushrooms, place the whole in a cool oven for half an hour, and strain through coarse muslin. Boil the liquid with peppercorns, half an ounce to the quart; mace, a dram; cloves, a dozen; and bruised ginger, half an ounce. When the liquid has boiled down to one-half of its previous volume, take it off the fire, allow it to cool, strain through very coarse straining cloth, and bottle in well-corked bottles. If these bottles are boiled and then sealed, the ketchup will keep the longer. Walnut ketchup is made by boiling a gross of soft, young walnuts, crushed, with two ounces each of ground nutmeg and black pepper, half an ounce each of ground mace and ginger, and fifty cloves, ground, in two quarts of vinegar for forty minutes.



Ketch.

Ketones, a series of hydrocarbon derivatives, in which two, either similar or different, alkyls are united to a carbonyl (CO) group. Thus, acetone or dimethyl ketone is $(CH_3)_2CO$, and propyl ethyl ketone is $C_2H_5(CH_2)_2CO$. Ketones are prepared by oxidizing secondary alcohols, or by heating the calcium salt of a fatty acid—acetone being prepared on the large scale from

calcium acetate in this way. Ketones are stable compounds that on reduction yield secondary alcohols, and unite with acid sulphites to form crystalline derivatives. They break up on oxidation. The lower members of the family are peculiarly smelling liquids; and the higher, inodorous solids.

Ketshwyo. See CETYWYO.

Kettering, mrkt. tn., Northamptonshire, England, 14 m. N.E. of Northampton. The church of SS. Peter and Paul is a handsome edifice in Perpendicular style. Boots and shoes are extensively manufactured; other industries are clothing, leather-dressing, and iron-founding. At Kettering was formed in 1792 the Baptist Missionary Society. Pop. (1901) 28,653.

Kettle-drum. See DRUM.

Keuper, the uppermost subdivision of the Triassic system, or New Red Sandstone. It consists essentially of red and green clays, with beds of white or brown sandstone, and some conglomerates. Some of these sandstones are of great importance in the Midlands of England, where they are known as water-stones. Among the red marls deposits of rock salt are found (from 700 to 3,000 feet thick), and the salt industry of Cheshire depends on these beds. In Germany the Keuper bears much the same general aspect as in Britain, but includes a deposit of impure coal—the Lettenkohlen.

Kew, suburban metropolitan dist. included in Richmond borough, Surrey, England, on the Thames, 6 m. s.w. of Hyde Park Corner. A handsome new bridge connecting it with Brentford was opened in 1903. The church on Kew Green, built in 1713, contains the mausoleum of the first Duke and Duchess of Cambridge, and in the churchyard is the grave of the painter Gainsborough. Dr. Turner (the 'father of English botany,' d. 1568) had at Kew a herbal garden of some note. In the 17th century Kew House was held by Sir Henry Capel, who devoted much attention to cultivation. In the 18th century, Frederick, Prince of Wales, made it his chief residence. George III. purchased the property, and usually resided during the summer in Kew House (demolished in 1803). Queen Charlotte died at Kew Palace in 1818. The Royal Botanic Garden was founded by the dowager Princess of Wales in 1759. The area at that time was only about eleven acres. In 1840 Queen Victoria resigned the gardens for the public benefit. Since that time immense improvements have been effected, and the area now amounts to 288 acres. The Temperate House, completed in 1899, is probably the largest plant-



Views in Kew Gardens (Royal Botanic Gardens), area 288 acres.

1. Rock Garden. (Photo by Frith.) 2. Temperate House. 3. The Wood Museum. 4. The Lake. 5. Queen Charlotte's Palace. (Photo by King.)
6. Temple of the Sun. (Photo by King.) 7. The Victoria Regia in bloom. (Photo by King.) 8. The Museum. 9. The Palm House.

house in the world. Connected institutions are the herbarium, museums (three) of economic botany, botanical library, the Jodrell laboratory, and a collection of paintings by Miss North. In 1897 Queen Victoria handed over Kew Palace and the Queen's Cottage to the nation. At Kew Observatory, Richmond, chronometers and other scientific in-

struments are tested. (See SCALE.) Key is also a name given to the outward termination of the levers in keyboard instruments, to the levers controlling valves in certain wind instruments, and to the appliance used in tuning pianos and harps.

Key. See LOCKS.

Key, in engineering, a general term denoting anything that

Commissioner Yeh. In 1872 he was appointed president of the Royal Naval College at Greenwich. In 1878 he became admiral, and was a lord of the Admiralty from 1879 to 1885.

Key, FRANCIS SCOTT (1780-1843), American lawyer and poet, born in Maryland; was the author of the national lyric, *The Star-spangled Banner*. In 1857 he published a volume of *Poems*.

Key-dwellers, the name given by archaeologists to an extinct race formerly inhabiting the many islets or *keys* (Sp. *cayos*) lying off the s.w. coast of Florida. The fact of their existence only became known to science in 1895, since when their settlements have been carefully investigated. Their islands were to a great extent artificial, being enlargements of tiny reefs or shoals by means of a remarkable series of shell-mound embankments, pyramids, and canals. Their civilization shows an affinity with that of Central America. See F. H. Cushing's report of the Pepper-Hearst Expedition, Philadelphia, 1897.

Key Islands. See KEI ISLANDS.

Keyne, ST. (d. 490), a Welsh saint, who is reputed to have endowed wells with miraculous powers; one, near Liskeard, in Cornwall, gives domestic supremacy to the husband or wife who first after marriage drinks of its waters. (See Southey's poem.)

Keyser, JAKOB RUDOLF (1803-64), Norwegian author, born at Christiania, where he lectured on history from 1829. With Munch he issued *Norges Gamle Love* (1846-9). In 1847 he wrote *Nordmændenes Religionsforfatning i Hedendommen*, which was long a standard work on Scandinavian mythology; and in 1856-8 published *Den Norske Kirkes Historie under Katholicismen*. After his death appeared his *Norges Historie* (1866-70).

Key West, fort. city and winter resort, Florida, U.S.A., co. seat of Monroe co., on an island of the same name, the most westerly of the Florida keys. It manufactures cigars, and carries on sponge-fishing. The United States have a naval station here. Pop. (1900) 17,114.

K.G., Knight of the Garter.

K.G.C., Knight of the Grand Cross.

K.G.C.B., Knight Grand Cross of the Bath.

K. G. F., Knight of the Golden Fleece.

K.H., Knight of Hanover.

Khabarovsk, tn., E. Siberia, at confluence of the Amur and Ussuri Rivers, 470 m. by rail N.E. of Vladivostok. It is a centre of the fur (sable) trade. Pop. (1897) 15,082.



The Khabar Pass.

struments are tested. Pop. of par. (1901) 2,699.

Kewanee, tn., Henry co., Illinois, U.S.A., 132 m. s.w. of Chicago; has manufactures of agricultural implements, and bituminous coal is mined. Pop. (1900) 8,382.

Kewkiang. See KIU-KIANG.

Key, in music, signifies the scale in which a composition is

fastens, and frequently a small steel bar in the shape of a wedge.

Key, SIR ASTLEY COOPER (1821-88), English naval officer, born in London; served at the battle of Obligado (1845), and in 1854-5 was present at the bombardment of Bomarsund and of Sveaborg; served at Calcutta during the mutiny, and in the China war (1858-60), he himself capturing

Khabur, riv., Asiatic Turkey, rising in the Karagah Mts. (vilayet of Diarbekir), and flowing 200 m. to the s. through Mesopotamia to join the Euphrates at Kerkisiah.

Khadija (556-613), the first wife of Mohammed.

Khafrā, CEPHREN, or SAOPHIS, an Egyptian king of the fourth dynasty, who built the second of the three pyramids, and the small temple behind the great Sphinx.

Khaibar or **Khyber Pass**, narrow defile, 33 m. in length, between N.W. India and Afghanistan, through the Safed Koh. It forms part of the route between Peshawar and Kabul, and at Jamrud is 45 ft. wide; at the fort of Ali Masjid, 9½ m. farther on, it is only 40 ft. wide. The summit of the pass is at Landi Kotal, which is 1,700 ft. higher than Jamrud, and 1,970 ft. higher than Dhaka fort, the w. end of the pass. It is overhung by mountains which rise sheer from the pass to heights varying from 1,400 to 3,000 ft. It is the only pass in the north-western frontier practicable for artillery. All the conquerors of India except Alexander the Great and the British made their way into India through it. It was forced by British troops during the Afghan wars of 1839-42 and 1878-80, and again in the Afridi campaign of 1897.

Khairabad, chief tn., Sitapur dist., United Provinces, India, 45 m. N.W. of Lucknow. Pop. (1901) 13,774.

Khairagarh, feudatory state, Central Provinces, India. Area, 940 sq. m.; pop. (1901) 137,542.

Khair-ed-din (d. 1890), a Circassian slave, educated by the bey of Tunis; became a liberal-minded minister of marine and prime minister. For seven years (1879-86) he was grand vizier of the Porte at Constantinople. He wrote *La plus sure direction pour connaître l'état des Nations* (1868).

Khairpur, feudatory state in Upper Sindh, India, with an area of 6,109 sq. m. The chief manufactures are cotton, silk cloth, and metal goods. Pop. (1901) 199,313. **Khairpur**, the chief town, 15 m. E. of the Indus, has a population (1901) of 14,014.

Khalfa, HAJI, or MUSTAFA-IBEN-ABDULLAH (1600-58), Turkish historian, born at Constantinople. His chief work is an encyclopædia of Oriental biography and bibliography, written in Arabic, and published by Flügel as *Lexikon Bibliographicum et Encyclopedicum Haji Khalfa* (8 vols. 1835-58), with Latin translation.

Kham, or **KHAMS**, prov. of E. Tibet, adjoining Szechuan prov. of China, and traversed by upper courses of Yang-tse-kiang, Mekong, and Salwin (here known as Di-chu or Giama-na-chu). Chief town is Chiamdo (Tsiando).

Khama, chief of the Bamangwatos, a Bechuana tribe, and the inveterate enemy of Lobengula, king of the Matabele, whom he defeated in battle.

Khamgaon, tn., Akola dist., Berar, India, 78 m. S.W. of Amraoti; has a cotton and opium trade. Pop. (1901) 18,341.

Khamil. See HAMI.

Khammurabi, or HAMMURABI, a king of Babylon, identified by Schrader with Amraphel, king of Shinar (Gen. 14:1). By his victories over Elam, Larsa, Sumer, and Akkad, he unified the Babylonian empire. His reign is

gion, law, and family life. See Johns's *Journal of Theological Studies* (Jan. 1903), and *The Oldest Code of Laws in the World* (1904); Cook's *Laws of Moses and the Code of Hammurabi* (1904).

Khamseh, prov., Persia, between Kazvin and Tabriz. Cap. Zenjen.

Khamsein, or KHAMSEEN, a hot, dry southerly wind of Egypt, occurring during the fifty days following Easter. It usually blows for three days, but has been known to last a week. The diseases peculiar to the country are then most virulent, and per-



Khammurabi receiving Laws from the Sun-god.

(Stele in the British Museum.)

variously dated between 2400 and 2000 B.C., and seems to have lasted some fifty-five years. Information regarding him had been increasing rapidly, but all advances were overshadowed by J. de Morgan's discovery (Dec. 1901 to Jan. 1902) of a large stele, on which are preserved a bas-relief of Khammurabi receiving laws from the Sun-god, and some nine-tenths of an inscription containing the code of these laws as promulgated by him. This, with translation and transliteration, was published at Paris, in 1902, by V. Scheil. The laws throw much light upon Babylonian social grades, industries, reli-

gions dying during its prevalence are buried without ceremony.

Khandesh, dist., Deccan, Bombay Presidency, India, through which flows the river Tapti. There are several factories for the ginning and pressing of cotton. Area, 10,907 sq. m. Cap. Dhulia. Pop. (1901) 1,427,382.

Khandwa, chief tn., Nimar dist., Central Provinces, India, 70 m. S.E. of Indore; contains remains of Jain buildings. It has superseded the old capital (Burhanpur) as a commercial centre. Pop. (1901) 19,401.

Khanka, or HANGKA, lake, E. Siberia, on the Russo-Manchurian boundary. It is drained into the

Usuri R., is 60 m. long from N. to S. by 25 to 50 m. from E. to W., and has an area of 1,690 sq. m. It is drying up rapidly.

Khan-Tengri, or TENGRI KHAN, or KAR-GÖL-BAS, highest mountain in the Central Tian-Shan system, E. of Issik-kul, and S. of the Ili R. Its highest point reaches 23,950 ft.

Kharbin, or HARBIN, tn. and railway centre in Manchuria, on the Sungari, the principal tributary of the Amur, 370 m. W. of Vladivostok, and 500 N. of Port Arthur. Here the trans-Siberian railway bifurcates, one branch going to Vladivostok, and the other to Mukden, Dalny, and Port Arthur. Kharbin is the centre of a rich agricultural and grazing district, and has large mineral fields yet undeveloped.

Kharkov. (1.) Government of S. W. Russia, one of the four composing Little Russia. Area, 21,041 sq. m.; pop. (1897) 2,503,811. The surface is flat and monotonous. Much of the soil belongs to the 'black earth' zone. Among its minerals are iron, gypsum, coal, peat, freestone, sandstone, fuller's and potter's earth, chalk, and salt. Beetroots are cultivated; flax, hemp, and tobacco are raised. Market gardening has made great progress. Bee-keeping is important; the culture of silk has lately made great advances. Industries are important: they include sugar works, distilleries, breweries, tobacco factories, sawmills, flour mills, fulling mills, oil works, factories of soap, candles, sweets, and gingerbread; there are also salt works, iron and copper found-

Kharpur, tn., Turkish Kurdistan, 60 m. N.W. of Diarbekir. There is an American Protestant college. Pop. estimated at 30,000.

Khartum, chief tn. of a prov. of the Egyptian Sudan bearing that name, and situated on the tongue of land at the junction of the Blue and White Niles, lat. 15° 36' N. Khartum is accessible from Wadi Halfa (570 m.) by the military railway in two days. After the murder here of General Gordon in 1885, the town remained in the hands of the Khalifa and Dervishes until September 1898, when a combined English and Egyptian force under General (now Lord) Kitchener retook the whole of the Sudan. A completely new town with fine public buildings and airy streets is now rapidly arising. It ex-



Kharbin: the principal Street.

(Photo by Underwood & Underwood.)

Founded in 1898, it has been well planned and built in modern European style. The river is crossed by an iron girder bridge eight hundred yards long. Industries include flour mills, brick works, distilleries, and meat-packing establishments. Pop. (1902) 20,000, (1904) over 60,000 Europeans and 50,000 Chinese, apart from the large army force. After the battle of Mukden, Kharbin became the reserve depôt and the chief base for the Russian army as well as the hospital centre; although in view of a possible early evacuation of the town some of the hospitals were removed in May 1905 to Chita, Siberia, 800 m. to the N.W. In December 1905 Kharbin suffered severely from the depredations of the mutinous troops in the Manchurian army.

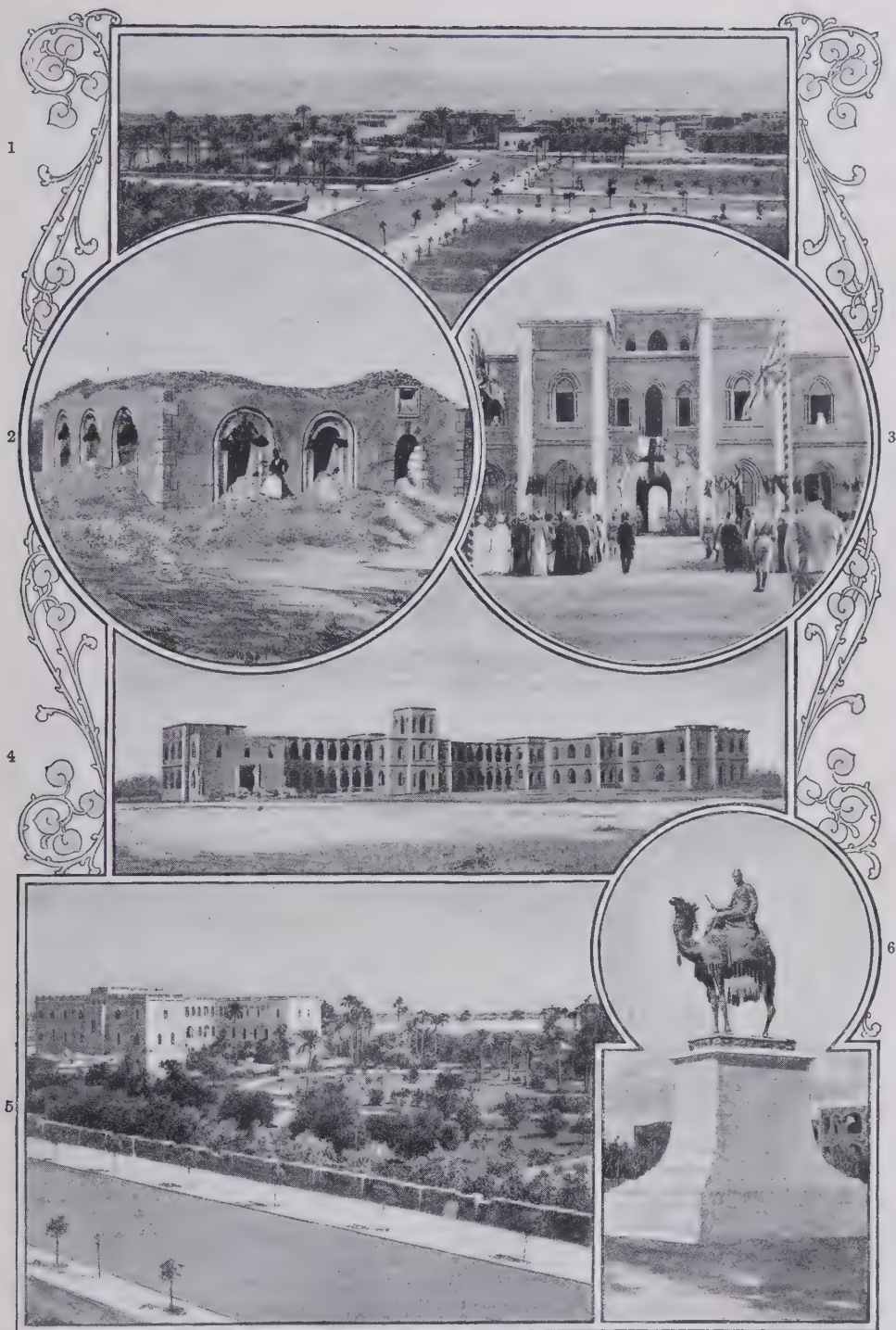
ries, brick works, tanneries, potteries, leather works, and woollen manufactures. (2.) City and cap. of above gov., 450 m. S. of Moscow. It is one of the most progressive towns of S. Russia. At its Epiphany and Trinity fairs a great business is done in horses and wool respectively. The industrial establishments include woollen manufactures, dyeing and cleaning works, distilleries and breweries, iron and copper foundries, tobacco, candle, gingerbread, and sweetmeat manufactures, and the making of machinery and agricultural implements. The university, founded in 1804, had in 1903 1,360 students. There are also a technological institute, a veterinary school, and a seminary. Kharkov was founded in 1650 by Cossacks. Pop. (1897) 174,846.

tends for 3½ m. along the river. There are the governor's palace (built on the foundations of Gordon's old house), the Gordon College, the administrative buildings, and an English church. There is a trade in gum, ivory, and ostrich feathers. Pop. (1901) about 20,000.

Khasi and Jaintia Hills. See JAINTIA HILLS.

Khasis, tribe inhabiting the Khasi Hills, Assam, India. They are a very primitive people, living under elective chiefs, and speak a monosyllabic language.

Khatanga, riv. of N. Siberia, issuing from various lakes, flows N. and N.E. into the Khatanga Gulf after a course of about 600 m. The gulf, which lies on the E. side of the Taimir peninsula, has a length of 200 m.



Views in Khartum.

1. General view. 2. The Mahdi's Tomb, Omdurman. 3. Gordon College—reception of Lord Kitchener. 4. Gordon College.
5. The Palace and the Gardens. 6. The Gordon Statue.

Khatmandu, cap. of feudatory state of Nepal, India, on the Bagmati R., 145 m. N. of Patna. The maharaja's palace is the chief building. Pop. (1901) about 50,000.

Khaya, a genus of tall trees belonging to the order Meliaceae, and closely allied to the mahogany tree. One species, *K. senegalensis*, the Senegal mahogany, is valuable for its timber. The khayas bear panicles of flowers at the ends of the branches, each flower having four petals and an eight-lobed stamen-tube.

Khayyam, Omar. See OMAR KHAYYAM.

Khazars, an old semi-nomadic people of Turco-Finnish origin, who formed a kingdom in S. Russia (c. 190-1020 A.D.). In their later history they figure as a commercial people; their principal cities were Itil, Sarkel, and Semender. Their sovereign and many nobles and others embraced Judaism in 740. Their power was largely broken by the Russians under Svyatoslav (965-969), and finally by the Byzantines and Russians combined (1016). Some etymologists consider the name can be traced in Kadzaria, the Georgian name of Mingrelia.

Khedive, the official title of the hereditary viceroy of Egypt. Vali ('viceroy') was used until 1867. Since the British occupation of Egypt the Khedive's power has been almost nominal. Abbas Hilmi Pasha (1874), the present Khedive, the great-great-grandson of Mehmet Ali, the founder of the dynasty, succeeded his father in 1892.

Khelat, or **KELAT**, a dist. at the N.E. angle of Baluchistan, and is for the most part barren, arid, and sparsely populated. Pop. (1901) 354,925. The fortified capital, Khelat, is the residence of the ruler of Baluchistan. It is dominated by a citadel containing the khan's palace. Pop. about 12,000.

Kheri, tn. and dist., United Provinces, India, 72 m. N. of Lucknow. Pop. dist. (1901) 905,138; tn. 6,223.

Kherson. (1.) Government, S.W. Russia, has the Black Sea to the s. and Bessarabia to the w. Area, 27,523 sq. m.; pop. (1897) 2,732,832. Almost the whole is steppe land, lying between the Dnieper and the Dniester. Cattle-raising is the chief occupation. The vine, hemp, flax, tobacco, and mustard are grown. The fisheries are important. Manufactures have been greatly developed of recent years. Wool, furs, sheepskins, tobacco, cereals, butter, cheese, and caviare are exported. An important feature of the province is to be found in the *limans*, or lagune-estuaries, along the Black Sea coast. Over fifty German agricultural colonies

exist. (2.) Capital of the above gov., 15 m. from the sea, on the w. side of the Dnieper estuary. It contains an observatory, a marine training college, and two naval shipyards. Kherson was founded in 1778 by Potemkin, the favourite of Catherine II. His tomb is in the cathedral. John Howard, the prison reformer, died here in 1796. Pop. (1897) 69,219.

Kherson (of the Crimea), tn., mostly ruined, in the south-western extremity of the Crimea, 2 m. w. of Sevastopol. It has a cathedral. Here a Greek colony was probably founded in the 5th century B.C., and here was the traditional scene of the martyrdom of St. Clement of Rome. It was long the chief Byzantine possession north of the Black Sea, was taken by the Russians under Vladimir the Great in 988, and was ruined by the Lithuanians in 1368.

Khing'an Mts., two ranges in E. Asia. (1.) GREAT K. separates the Gobi desert plateau from Manchuria. It commences in about 44° N. lat. and 118° 20' E. long., and runs first N.N.E., then N. to Argun R., near its confluence with Shilka; here the Amur commences. In 1720-1 it was violently agitated by eruptions and earthquakes. Its highest peaks reach about 8,000 ft. (2.) LITTLE K. lies mainly to the s. of the Middle Amur, and E. of the Great Khingan. It really continues N. of the Amur up to about 53° N. lat. The Little Khingan proper does not exceed 3,300 ft., but in the hills that unite the two ranges there are heights of 4,800 ft.

Khiros. See CHIOS.

Khiva. (1.) Ancient *Khorasmia*; *Khorizm* or *Khwarezm* of Moslem writers. Vassal khanate of Russian Central Asia, on the Lower Oxus (Amu Daria), bounded on N.E. and E. by the Oxus, on N.N.W. by Aral Sea, and on other sides by Kara-kum desert. Area, about 22,320 sq. m.; pop. estimated at 800,000. Of these, 400,000 are nomadic Turcomans, the rest (Tajiks, Uzbeks) being concentrated in the fertile oasis of Khiva proper, which is maintained by an extensive system of irrigation. The climate is bright and cloudless. Summer is exceedingly hot; winter is short but severe. Corn, barley, rice, millet, cotton, pease, lentils, tobacco, hemp, poppies, and madder are cultivated, and fruit trees abound. There is a fine breed of horses. The government is still in name a military despotism of Mohammedan type, but since 1873 the real ruler has been the Russian resident. Khiva formed part of the first and second Persian empires, of the empire of Alexander, and of the caliphate

of the 8th and 9th centuries. The Mongols dealt it terrific blows in the 13th century. In 1512 it was secured by the Uzbeks. (2.) Town, cap. of above khanate, 17 m. from the Oxus, and 450 m. w. of Tashkend. Walls encircle both the town and the citadel. Thirty mosques and over twenty madrasas or Moslem colleges are the principal buildings of the outer city, the most remarkable being the mosque built over the tomb of Polvan, patron saint of Khiva. Silks, cottons, and carpets are manufactured. Pop. 5,000. See Muraviev's *Voyage en Turcomanie et en Khiva* (1823); Abbott's *Journey from Herat to Khiva* (1843); Danilevski's *Description of the Khanate of Khiva* (1843; in Russian); Vambéry's *Voyage d'un faux derviche* (1865); Butakov's *Enquiries respecting the Syr Daria and Amu Daria Rivers* (1866; in Russian); Lezch's *Chiva oder Kharezm* (1873); Khanikov's *Documents Relative to Khiva* (1873; in Russian); Veniukov's *Khiva* (1873; in Russian); H. Stumm's *Russia's Advance Eastward* (1874); McGahan's *Campaigning on the Oxus and the Fall of Khiva* (1874); Schmidt's *Expedition gegen Chiva* (1874); Rawlinson's *England and Russia in the East* (1875); Burnaby's *Ride to Khiva* (1876); Keane's *Asia*, vol. i.; Mielberg's *Exkursion nach Chiva* (1880); articles on 'Khiva' in *Nouvelle Géographie Universelle* (1887), in *The International Geography* (1899), in *The Statesman's Year-Book* (1903), and in the *Almanach de Gotha* (1904).

Khnopff, FERNAND (1859), Flemish painter, born in Bruges; has been much influenced by the work of Burne-Jones and the early impressionism. He became a member of the *Vingstistes*, and was the moving spirit in the new Société des Beaux-Arts. A dreamer and thinker, he seeks to reproduce the surfaces of beautiful forms and heads; the enigmatic in expression characterizes his compositions, such as *L'Aile Bleue* and *L'Enceins*. He has exhibited at the New Gallery and international exhibitions, London; his *Sleeping Medusa* is in the Walker Gallery, Liverpool.

Kholi, tn., Azerbaijan, Persia, 75 m. W.N.W. of Tabriz, and on the trade route between Tabriz and Trebizond. It has a strong fortress. Here in 1514 the Turks under Selim I. routed the Persians under Shah Ismael. Pop. 30,000.

Khoi Kholi. See HOTTENTOT.

Khojak Pass, at an alt. of 8,000 ft., leads through the Khoja Amram range, between the British district of Pishin, Baluchistan, and Afghanistan, 53 m. N.N.W. of Quetta. It is on the road to Kandahar.

Khojent, tn., Syr Daria prov., Russian Central Asia, 95 m. s.s.e. of Tashkend, on left (s.) bank of Syr Daria. It is surrounded by a double wall, and has an ancient citadel. There are manufactures of coarse cotton goods, and many gardens and orchards in the suburbs. Throughout the 18th century and at the beginning of the 19th it was the head of a small independent principality. Pop. (1891) 30,076, largely Tajiks.

Khokand, or **KOKAN**. See FERGANA.

Kholm, tn., Lublin gov., Russian Poland, 20 m. N.E. of Kvasnostav. See of Orthodox bishop, it has a magnificent cathedral. Pop. (1897) 19,236.

Khonds, a people of Kolarian stock who inhabit Madras and the east of the Central Provinces of India. They are small in stature and dark in colour. Their government is patriarchal. They are quite distinct from the Gonds, with whom, owing to the similarity of name, they have been confused.

Khonsar, tn., Irak Ajemi, Persia, 93 m. W.N.W. of Ispahan; has trade in dried fruits. Pop. 12,000.

Khorassan, N.E. prov. of Persia, bounded on the E. by Afghanistan, and on the N. by Transcaspia. The southern part is sandy desert, but the rest, traversed by spurs of the Elburz Mts., has fertile valleys. The province is some 200,000 sq. m. in area. Turquoises are mined near Nishapur. Wheat, rice, and tobacco are grown; wool, cottons, carpets, and turquoises are exported. The capital is Meshed. Pop. 1,000,000.

Khosrau. See CHOSROES.

Khotan, oasis and city of E. Turkestan, 160 m. E.S.E. of Yarkand, on the l. bk. of the Khotan Daria. Exports jade, silk, musk, cotton, carpets, felt, wool, and furs. Down to 1864 the industry of jade-cutting flourished at Khotan. From very early times the Khotan oasis was one of the chief centres of sericulture. Pop. (1900) 5,000. Under the Han dynasty (the 4th century A.D.), Khotan is said by Chinese annalists to have been a city of 85,000 people, and a great light of the Buddhist world. The oasis has an area of about 400 sq. m., and a population (1900) of 50,000. Cereals, including maize, rice, flax, hemp, tobacco, and cotton, are cultivated. The buried cities of the Khotan district have been discovered by the Swedish traveller Sven Hedin, and visited by Stein, who brought away many inscribed tablets now in the British Museum.

Khotin, or **KHOCZIM**, tn., Besarabia gov., S.W. Russia, 10 m. s.s.w. of Kamenets-Podolski, on

the s. side of the Dniester, close to the Austro-Russian frontier. Pop. (1897) 18,126.

Khulna, chief tn. of dist. of same name, Bengal, India, 109 m. E. by N. of Calcutta; has a river trade. Pop. (1901) 10,426. The district is 2,077 sq. m. in area, and has a population (1901) of 1,253,043. It manufactures sugar from dates.

Khurja, chief tn., Bulandshahr dist., United Provinces, India, 50 m. S.E. of Delhi. It exports raw cotton, and has a new Jain temple. Pop. (1901) 29,277.

Khushab, munic. tn., Shahpur dist., Punjab, India, on the r. bk. of the Jhelum, 105 m. S.S.W. of Rawal Pindi, with a trade in cotton goods. Pop. (1901) 11,403.

Khuzistan, or **ARABISTAN** (anc. *Susiana*), prov. of S.W. Persia, between N. end of Persian Gulf and Bakhtiari Mts. It is mostly mountainous, but the soil in the valleys is exceedingly fertile; the southern portion consists of well-watered plains, the Karun being the principal stream. Rice, maize, barley, dates, cotton, and indigo are produced. Wool is a valuable product. Shuster is the capital. Area, 25,700 sq. m. Pop. 200,000.

Khvalynsk, tn., gov. Saratov, Russia, on the l. bk. of the Volga, 145 m. N.E. of Saratov; trades in grain. Pop. (1897) 15,455.

Khyber Pass. See KHATBAR PASS.

Kiakhta, tn., gov. Transbaikalia, Siberia, 180 m. S.E. of Irkutsk, situated close to the Chinese commercial settlement of Maimachin. A very important trading centre, especially for tea, the value of which amounts to over two millions sterling annually. It contains a cathedral. Pop. 5,000.

Kiang. See KULAN.

Kiangri, KIANKAREE, or CHANGRA, tn., Asiatic Turkey, 62 m. N.E. of Angora. Pop. about 16,000.

Kiang-si, prov., Central China, with an area of 72,176 sq. m. It contains the basin of the Kan and other rivers draining into the Poyang Lake, which itself has an area of 1,200 sq. m. Many of the rivers of the province are navigable for great distances. There is only a short portage from the head of the Kan R., by the Meiling Pass, to the Canton waters. Rice, wheat, silk, cotton, tea, and sugar are produced in the valleys; porcelain is manufactured in large quantities at King-te-chen; and there is much valuable timber in the mountains which encircle the province. Nan-chang-fu is the capital. The head of the Taoist priesthood has always resided in this province. His present home is in the Lung-hu-shan (Dragon-tiger Mt.). Pop. (1901) 26,532,000.

Kiang-su, maritime prov., China. Area, about 45,000 sq. m.

It lies between lat. 31°-35° N. and long. 116°-122° E., is traversed by the Yang-tse-kiang, and intersected in every direction by canals, including the best portion of the Grand Canal. There are many large lakes, natural and artificial. Though desolated by the Taiping rebellion, it is now one of the richest provinces of China. The soil is alluvial, and produces large quantities of rice and wheat, beans, cotton, silk, and peaches. Nanking, its capital, is the residence of the viceroy of Kiang-su and Kiang-si. Shanghai is in this province. Pop. (1901) 23,980,000.

Kiang-yin. See CHIANG-YIN.

Kiao-chau. See CHIAO-CHOU.

Kia-ting-fu. See CHIA-TING-FU.

Kicking Horse Pass, in the Rocky Mts., on the E. boundary of British Columbia, Canada; has an alt. of 5,296 ft., and is crossed by the Canadian Pacific Ry.

Kidd, BENJAMIN (1858), English sociologist, who won distinction by his first work, a brilliant essay on *Social Evolution* (1894). This was followed by *The Control of the Tropics* (1898), *Principles of Western Civilization* (1902), 'The Application of the Doctrine of Evolution to Sociological Theory' (*Ency. Brit.* v. xxix. 1902), and other papers developing further his system of social philosophy. Kidd held that society should be interpreted in terms of biology, but qualified the logical outcome of his argument by admitting the influence of religion in furnishing the basis of individual self-sacrifice for the public good.

Kidd, WILLIAM (c. 1650-1701), the piratical Captain Kidd of popular tradition, supposed to have been born in Greenock, Scotland, and to have settled in Boston, Massachusetts. In 1696 he was appointed to command the *Adventure*, with a commission to act against the French and to suppress pirates. In 1699 complaints reached England that Kidd had himself turned pirate. He was captured the same year in Boston, brought to England, tried, and hanged.

Kidderminster, munic. and parl. bor. in Worcestershire, England, 15 m. N. of Worcester, near the confluence of the Stour with the Severn. The church of St. Mary, partly Early English, contains several ancient monuments. There are schools of science and art (about 600 pupils). Brinton Park is a recreation ground, and there is a statue of Rowland Hill, born here 1795. The manufacture of carpets, introduced about 1735, is still the staple industry; the principal kinds now made are Brussels and Wilton, and to a less extent royal Axminster. Worsteds spin-

ning and dyeing are also carried on, and in the vicinity are iron and tin-plate works. It returns one member to the House of Commons. Pop. (1901) 24,681.

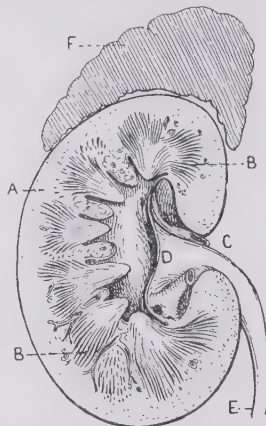
Kidnapping is the stealing, carrying away, or secreting any person, and is a common law offence in England, punishable by fine and imprisonment; but although not a term of law, the word is more properly used of the forcible abduction or stealing of a person and sending him out of the country, so that he is deprived of the assistance of the law. The twelfth section of the Habeas Corpus Act of Charles II. (31 Car. II. c. 2) imposes heavy penalties for this offence. Child-stealing, either with intent to deprive any parent or guardian of the possession of the child, or with intent to steal any article from its person, is a felony punishable with three years' penal servitude. See also ABDUCTION.

Kidney Bean. See BEAN.

Kidneys are excretory organs whose function is to get rid of nitrogenous waste. Among invertebrates, the commonest form of excretory organ is a small coiled tube, communicating, primitively at least, with the body cavity internally, and also with the exterior. In an annelid—*e.g.* the earthworm—we get a series of such tubes, each with its own internal and external apertures. Such tubes are known as nephridia. They were probably originally simple drainage tubes, conveying products direct from the coelum to the exterior; but in most instances they are supplied by numerous blood-vessels, and it is from these that the waste products are obtained by the cells of the nephridia. In consequence, a tendency towards the reduction or disappearance of the internal opening manifests itself as we ascend in the scale, and the blood-supply becomes efficient. Again, while primitively each tubule opens independently to the exterior, an obviously advantageous specialization, where the tubules are numerous, is that all should have one common opening. With regard to the vertebrate kidney, it may be sufficient to say that it consists of a compact mass of small tubules, which have lost their primitive internal openings, and open externally into a common duct (the ureter), which conveys their products to the exterior, in many cases through a urinary bladder, in which the fluid products can be temporarily stored. In order that they may adequately fulfil their function, the tubules are abundantly supplied with blood-vessels. But in the higher vertebrates, reptiles, birds, and mammals, the tubules are much more

complex in structure than in lower forms; and development shows that they are not homologous with those constituting the kidney in lower forms. On the other hand, the embryo bird, reptile, and mammal have tubules similar in structure to those which occur in the lower vertebrates.

In man, the kidneys are two excretory organs situated in the back part of the abdomen, one on each side of the lumbar portion of the spinal column. Each is somewhat bean-shaped, presenting its concave border towards the spine. The peritoneum covers their anterior aspect. Each is about four inches long, two inches broad, and one inch thick, the left being slightly the larger. In the central part of the con-



Section of Human Kidney.

A, Cortical substance; B, pyramids; C, hilum; D, pelvis; E, ureter; F, suprarenal capsule.

cave border is a notch known as the hilum, through which enter the blood-vessels, nerves, and lymphatics, and from which arises the ureter or excretory duct. Over the upper end of each kidney is situated a small ductless gland, the supra-renal capsule. The function of the supra-renal bodies is imperfectly known, but their destruction by disease is followed by grave and generally fatal constitutional symptoms. (See ADDISON'S DISEASE.) The function of the kidneys is the secretion of urine, which consists of water containing urea and the various other waste products that result from body metabolism, and are carried to the kidney by the blood in the renal arteries. The kidney cells have the power of picking up urea and other poisons from the blood and of passing them into the kidney pelvis, the purified blood being returned to the circulation by the renal veins. The

average amount of urine secreted in twenty-four hours is fifty ounces, containing about 500 grains of urea and a similar quantity of other solids. When the fluids of the body are diminished by free perspiration or by diarrhoea, the urine is also diminished in quantity, but may be concentrated and high-coloured from the relatively high proportion of solids. The other solids consist chiefly of phosphates, urates, chlorides, sulphates, oxalates, and uric acid, with traces of more complex substances.

Diseases.—Malformations of the kidney are occasionally found, the two kidneys being sometimes fused into a horseshoe-shaped organ. Such conditions do not, as a rule, call for treatment. Movable or floating kidney gives rise to little or no trouble as a rule, but in some cases it does produce discomfort and pain. Generally a truss can be devised which relieves the symptoms, but occasionally it is necessary to stitch the organ in its place. Sarcomatous or cancerous new growths in the kidney are of extreme gravity. They generally produce hæmaturia—*i.e.* blood in the urine, and rapid emaciation. Pain is not invariably present; but should clots of blood be impacted in the ureter, severe renal colic ensues. Medicinal treatment is of no avail, and operative interference is advisable only when the tumour is small and primary, and when the patient is still in fairly robust health. The commonest disease of the kidney is nephritis or inflammation (Bright's disease). The acute form is most frequently caused by cold, and the temperate are specially susceptible to nephritis. Certain fevers, particularly scarlatina, lead to the condition. Pregnancy seems to favour the occurrence of nephritis, and the onset of kidney disease during gestation is sometimes disastrous. (See NEPHRITIS.) Renal colic is generally caused by a calculus or deposit of some of the solid constituents of the urine. Calculi most frequently result from the deposit of uric acid or of calcium oxalate; but blood clots and the ova of parasites, as well as other substances, often form the nuclei of stones. In the form of sand these concretions may give rise to little or no discomfort; but when the calculus approaches the size of a pea, it may become impacted in the ureter, and as it is forced through the narrow tubular portion by the accumulation of urine behind, it leads to agonizing pain, often accompanied by vomiting and collapse. The irritation caused by calculi lying in the pelvis of the kidney occasionally

leads to a somewhat similar condition known as pyonephrosis, in which the collection of fluid is pus. The purulent infection may not be confined to the pelvis of the kidney, but may spread to the substance of the gland and produce pyelonephritis. Other causes than calculi may bring about such a result, of which cystitis, or inflammation of the bladder, is the commonest. Tubercle and some infective fevers are also responsible for producing suppuration of the kidney; and similar causes sometimes lead to the development of a perinephritic abscess—i.e. an accumulation of pus around the kidney, which, however, may be caused by direct injury, by spinal caries, or by perforation of the bowel. In the treatment of renal colic it is generally necessary to keep the patient well under the influence of morphine while the paroxysm lasts. Relief is also got from hot fomentations, and an attempt should be made to soften or break up the concretion by keeping the urine abundant, and in most cases alkaline. Hyoscyamus has a soothing effect upon the pain, and piperazine has been much advocated as a solvent of uric acid calculi. In purulent affections of the kidney surgical aid should be given early. Diabetes, although producing great changes in the chemical constitution and in the quantity of the urine, is not due to disease of the kidneys.

Kidney-stones, small red or brown mammillated, nodular, concretionary masses of clay iron-stone, with veins of calcite, which are found in the Oxford clay near Weymouth in the south of England.

Kidney Vetch, or LADY'S FINGER, a name given to plants belonging to the genus *Anthyllis*, a subdivision of the order Leguminosæ. *A. vulneraria*, the common kidney vetch, is a well-known British herbaceous plant, having glaucous pinnate leaves with a terminal leaflet, and in summer crowded heads of yellow flowers with swollen calyces. The flowers are occasionally cream-coloured or pinkish. The stamens are all united by their filaments, which feature helps to define the genus.

Kidron, or CEDRON (mod. *Wady en Nâr*), brook, Palestine, flows through the valley of Jehoshaphat, then E. between Jerusalem and Mount of Olives to the Dead Sea. Except in winter it is dry.

Kidwelly, or CYDWELL, seapt. and mrkt. tn., Carmarthenshire, Wales, near Carmarthen Bay, 8 m. S. of Carmarthen; has coal mines, iron, tin, and brick works. Its castle dates from the 12th century. Pop. (1901) 2,285.

Kieff. See KIEV.

Kiekie, a New Zealand shrub, *Freycinetia Banksii*, belonging to the order Pandanaceæ. It climbs to a considerable height, and bears a large quantity of berries crowded on a spadix. The young spadices are made into a jelly, which has a strawberry-like flavour.

Kiel, seapt., Prussia, prov. Schleswig-Holstein, on a bay of the Baltic, near the Baltic end of the Kaiser Wilhelm Canal, 70 m. by rail N. of Hamburg. It is the chief naval station of the German empire. The old town has narrow, crooked streets. The Thaulow Museum, the former castle of the dukes of Holstein-Gottorp, the provincial museum of antiquities, the university (1,200 students in 1905), the naval academy, and the naval school are the principal institutions. Kiel is a centre of trade with Denmark and Scandinavia. Its industries include shipbuilding, flour, oil, and saw mills, engineering works, and breweries. The harbour is strongly fortified. The treaty of Kiel was signed here in 1814. Pop. (1900) 107,977.



Kidney Vetch.

1, Flower.

Kielce. (1.) Province of Russian Poland. Area, 3,897 sq. m. The Vistula separates it from Austrian territory on the S. and S.E. The chief minerals are iron, lead, and copper; zinc, coal, calamine, marble, gypsum, clay, and sulphur are also found. The black earth soil extends over part of the province. Potatoes are an extremely important crop. The chief industries are potteries, tanneries, tile works, sawmills,

flour mills, manufactories of metal objects. Pop. (1897) 763,746. (2.) Town, cap. of above gov., 105 m. S. of Warsaw. It is the see of a Roman Catholic bishop, and has Roman Catholic and Orthodox cathedrals, a Roman Catholic seminary, an ancient chateau (built in 1638; the residence of Charles XII. of Sweden in 1702). Chief industries: iron and sugar factories, rope-making, dyeing, brick-making, cement manufacture, distilling. Pop. (1897) 23,189.

Kielland, ALEXANDER LANGE (1849), Norwegian author, born at Stavanger; has been burgomaster of his native place since 1891. One of the leading Norwegian novelists, he wields a sharp, sarcastic pen, steeped in pessimistic realism; his condensed, epigrammatic style is not unlike that of Maupassant. He first made his reputation with the nautical novel, *Garman og Worse* (1880), which was followed in rapid succession by the novels *Arbeidsfolk* (1881); *Else* (1881); *Skipper Worse* (1882); *Gift* (1883); *Fortuna* (1884); *Sne* (1886), with some fine descriptions of winter scenery; *Bettys Formynder* (1887), a satirical play; *Sankt Hans Fest* (1887); *Professoren* (1888), a play; and *Jacob* (1891).

Kiepert, JOHANN SAMUEL HEINRICH (1818-99), German cartographer, was born in Berlin. From 1845 to 1852 he was director of the Weimar Geographical Institute; was appointed extraordinary professor of historical geography at the Berlin University in 1859, and director of the topographical department of the Statistical Bureau in 1864. Ancient geography was his favourite study. Among his works are a historical *Atlas von Hellas* (1841-6), *Karten von Kleinasien* (1843-5), *Hand-Atlas* (1854), *Atlas Antiquus* (1855), and a great map of Asia Minor (unfinished). He was also author of a *Lehrbuch* (1879) and *Leitfaden der Alten Geographie* (1879; Eng. trans. 1881).

Kierkegaard, SÖREN AABYE (1813-55), the greatest of Danish thinkers, was born at Copenhagen. His literary activity is divisible into two periods. In the first (1843-6) he was principally concerned with the nature of religion and man's relation to it; and in the second (1849-55) he waged war upon religion as exemplified in the national Danish Church. His most important books of the earlier period are entitled *Enten-Eller* (i.e. *Either-Or*, 1843) and *Stadier paa Livets Vej* (i.e. 'Stages of Life', 1845). In these and in other works he discusses, with singular dialectical skill, great charm and mastery of language, profound depth and subtlety of thought, and with

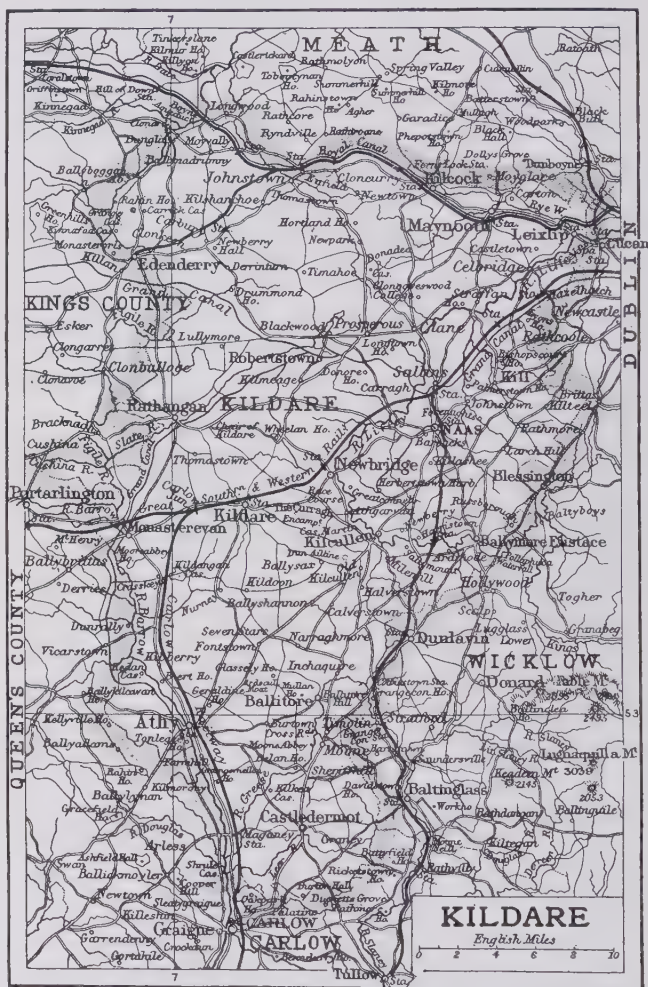
strong interplay of irony and paradox, the 'real values' of the aesthetic, the ethical, and the religious conceptions of life. These two books were supplemented and completed by the *Frygt og Bæven* (1843), *Gjentagelsen* (1843), *Begrebet Angest* (1844), *Afsluttede videnskabeligt Efterskrift* (1846), *Indøvelse i Christendom* (1850). An edition of his *Collected Works* was begun at Copenhagen in 1901. See Höffding's *Søren Kierkegaard som Filosof* (1892; German trans. 1902); Bärthold's various books (1875-86); Georg Brandes's *S. Kierkegaard* (1879); and H. Lund's *Mit [Kierkegaard's] Forhold til Hende* (1904).

Kieselguhr, or **DIATOMITE**, a fine-grained, gray or brownish, friable, porous, infusorial earth, consisting of the siliceous frustules of diatoms. When pure it is almost entirely composed of silica. It is a deposit of still fresh-water lakes. It is found in Aberdeenshire and in Skye, in Switzerland, Germany, and Sweden, also in N. America. Formerly it was largely obtained from Tripoli, and was hence known as tripoli powder. Kieselguhr serves largely as a polishing powder for steel and other metals, as an ingredient in certain gritty soaps, and as a non-conducting fireproof packing for boilers and steam-pipes, on account of its porosity and its resistance to acids. It forms the absorptive medium of dynamite.

Kiev, or **KIEFF**. (1.) Government of S.W. Russia, with an area of 19,340 sq. m. The country is undulating, and much of the land is 'black earth', though towards the s. poorer and more sandy steppe-lands occur. The Dnieper borders or traverses the province from N.N.W. to S.E. All kinds of grain and fruit, including millet, as well as hemp, flax, and tobacco, cherries and plums, melons and water-melons, are grown. Next to agriculture, cattle-breeding is the chief occupation. Its sugar manufacture ranks first in all Russia; then come distilleries, cloth, candles, soap, agricultural implements, and tobacco industries, tanneries, iron foundries, brick works, and paper mills. The chief minerals are iron, lignite, graphite, marble, and granite. Little Russians form the majority of the population. Jews amount to fully ten per cent. Kiev suffered much from the rioting and outbreaks which followed the close of the Russo-Japanese war (1905). (2.) Chief tn. of above gov. and of all Little Russia, on r. (w.) bk. of Dnieper, 660 m. s. of St. Petersburg. Most of the antiquities of Kiev are in the old town—e.g. the 'Golden Gate', a relic of the mediæval fortress.

tions; the church of St. Sophia, built in 1037, with the tomb of its founder, Prince Yaroslav; the churches of St. Basil and of the Nativity, still older. The Pechersk quarter is to the s. of the old town, on the loftiest ground (460 ft.) in Kiev. Here are the tomb of Askold, the Russo-Varangian leader of the 9th century, and the

greatest centre of Russian devotion. The Podol, once the exclusively mercantile quarter of Kiev, lies between this, the high ground, and the river. The newest town of all, stretching out to the railway station, contains the church of St. Vladimir, ornamented with remarkable fresco pictures by leading Russian



old wooden church of St. Nicholas the wonder-worker; but the most famous building is the Pecherskoi monastery, said to have been founded by St. Anthony in the 9th century, with catacombs, in which many venerated Russians are buried—*e.g.* the chronicler Nestor, the 'father of Russian history.' Every year from 200,000 to 350,000 pilgrims visit this

artists. The university was founded by Nicholas I. in 1834; in 1905 it had 2,664 students. There are also an academy of theology (1631), a cadet school, and a technical school. The most important of the industries are sugar and tobacco, brick and machine works, distilleries, breweries, tanneries, flour mills, and manufactures of macaroni, gin-

gerbread, and chemicals. From the Upper Dnieper it is an easy passage to Lake Ilmen, Old Novgorod, the Volkhov, the Neva, and the Baltic, as well as to the Western Dvina and the Gulf of Riga. Also the 'West to East' route, which has been noticed alike by historians and scientific geographers as running along the sources of rivers from Cracow and the Vistula, and continuing along or near the parallel of 50° N. lat., brings us to the Middle Dnieper just at Kiev. According to the Russian annals, Askold and Dir, followers of Rurik, took

ghum, maize, and yam. It includes Mt. Kenia, and, ranging in elevation between 4,500 and 18,600 ft., enjoys a climate as temperate as that of Europe. The rainfall is abundant. Estimated pop. 323,000.

Kilakarai, seapt. tn., Madura dist., Madras, India, on the Gulf of Manaar. Pop. (1901) 11,078.

Kilauea, volcanic crater in the S.E. of Hawaii, on the E. slope of Mauna Loa. Notable eruptions occurred in 1789, 1823, 1832, 1840, and 1868.

Kilbarchan, par. and tn., Renfrewshire, Scotland, 5 m. W.S.W. of

a military camp and racecourse. Agriculture is the chief employment. The county returns two members to Parliament. Antiquarian remains include round towers, raths, and earthworks. Area, 654 sq. m. Pop. (1901) 63,566. (2.) Market town and (Anglican) episc. see, cap. of above co., 32 m. W.S.W. of Dublin. The cathedral dates from the 13th century, and near it are remains of an ancient cross and a round tower. A monastery was founded here in the 5th century by St. Bridget. There are remains of a castle and a Carmelite



Kilima-Njaro (Mawenzi from the south-west).

(From Meyer's 'First Ascent of Kilima-Njaro, by permission of Messrs. G. Philip & Son.)

Kiev from the Khazars about 882. Here Christianity was preached by St. Vladimir in 988. From that time Kiev was one of the principal towns in Russia. The Mongol storm of 1239, however, ruined it. In 1320 it fell into the hands of the Lithuanians, and from 1386 belonged to the Polo-Lithuanian kingdom. In 1667 it was seized by Moscow. Pop. (1897) 247,432. See Mukalov's *Géographie du Gouvernement de Kiev* (1883); Zakrevski's *Opisanie Kieva* (1868); Taranovski's *The Town of Kiev* (1881); and De Baye's *Kiev, la Mère des Villes Russes* (1896).

Kikuyu, or KENIA, dist. of British E. Africa, bordering Uganda on the W. It grows sweet potato, beans, millet, sor-

Paisley; has hand-loom weaving, calico printing, and papermaking. Pop. (1901) par. 7,226; tn. 2,886.

Kilbirnie, tn., Ayrshire, Scotland, 20 m. N. of Ayr. The industries are flax-spinning, linen thread and fishing nets, flannel shirtings, rope works, and iron and steel works. Pop. (1901) 4,571.

Kilbowie. See CLYDEBANK.

Kildare. (1.) Inland co., prov. Leinster, Ireland, with Dublin and Wicklow on the E. Part of the north-west belongs to the Bog of Allen; much of the surface is flat or slightly undulating. The principal rivers are the Liffey, the Boyne, and the Barrow. The Royal and the Grand Canal cross the county. In the centre is the plain of the Curragh,

friary, both of the 13th century. Pop. (1901) 1,576.

Kilia, or KILIYA, tn., Bessarabia, S.W. Russia, 25 m. E.N.E. of Ismail city, on the Kilia branch of the Danube delta. Pop. (1897) 11,703.

Kilian, St. (c. 644-697), the apostle of Franconia and bishop of Würzburg in the 7th century; was one of the Irish missionary-monks who Christianized Western and Central Europe. He converted the Thuringians, but was beheaded in Würzburg.

Kilimane. See QUILIMANE.

Kilima-Njaro, mountain mass just inside the N. frontier of German E. Africa, 175 m. from the coast; covering 45 m. from N. to S. by 40 m. from E. to W., and culminating in the two peaks

Kibo (19,720 ft.) and Kimawenzi (17,570 ft.). Both are craters of extinct volcanoes, and both are snow-capped down to about 15,000 feet.

Kilkenny. (1.) County, prov. Leinster, Ireland. The surface is in great part flat, with numerous low isolated hills. The county is drained to Waterford harbour by the Barrow, Nore, and Suir.

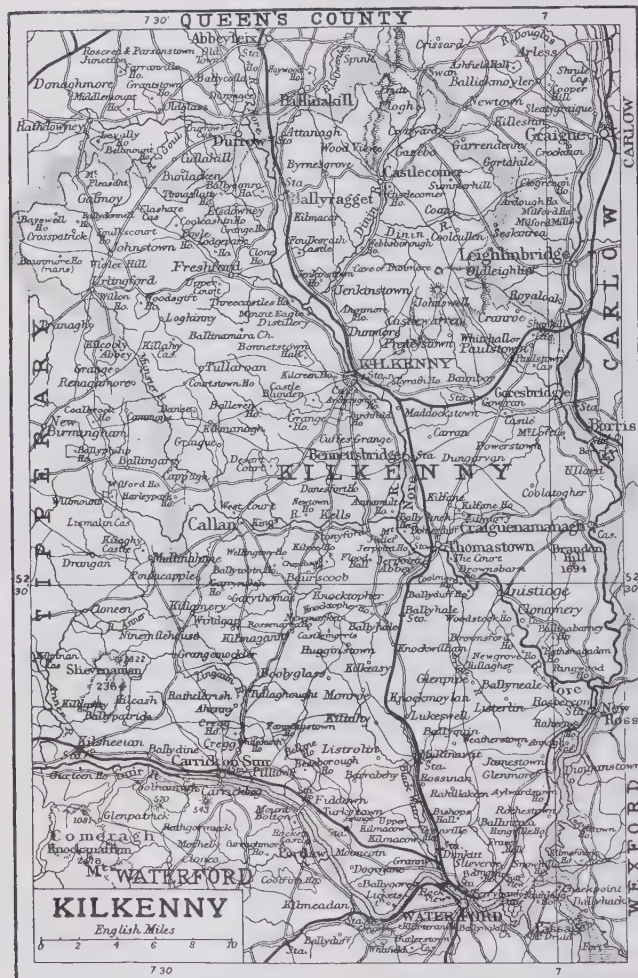
792 sq. m. Pop. (1901) 79,159. (2.) City, parl. and co. bor., cap. of Co. Kilkenny, on the Nore, 73 m. s.w. of Dublin. The cathedral of St. Canice was founded in the 13th century, when the see of Ossory was transferred hither from Aghaboe. Near it are remains of a round tower. The castle, now modernized, was erected in the 13th century. The

The city was taken by Cromwell in 1650. Its industries include blankets and coarse woollen and linen cloths. There are large marble works near the town, and an important provision trade through Waterford. Pop. (1901) 10,609.

Killaloe, par. and tn., Co. Clare, Ireland, on r. bk. of Shannon, 12 m. N.E. of Limerick. The cathedral dates from 1160. The town was the capital of the O'Briens, kings of Munster. To the N. are slate quarries. The Shannon Steam Navigation Company has its headquarters here. Pop. (1901) 885.

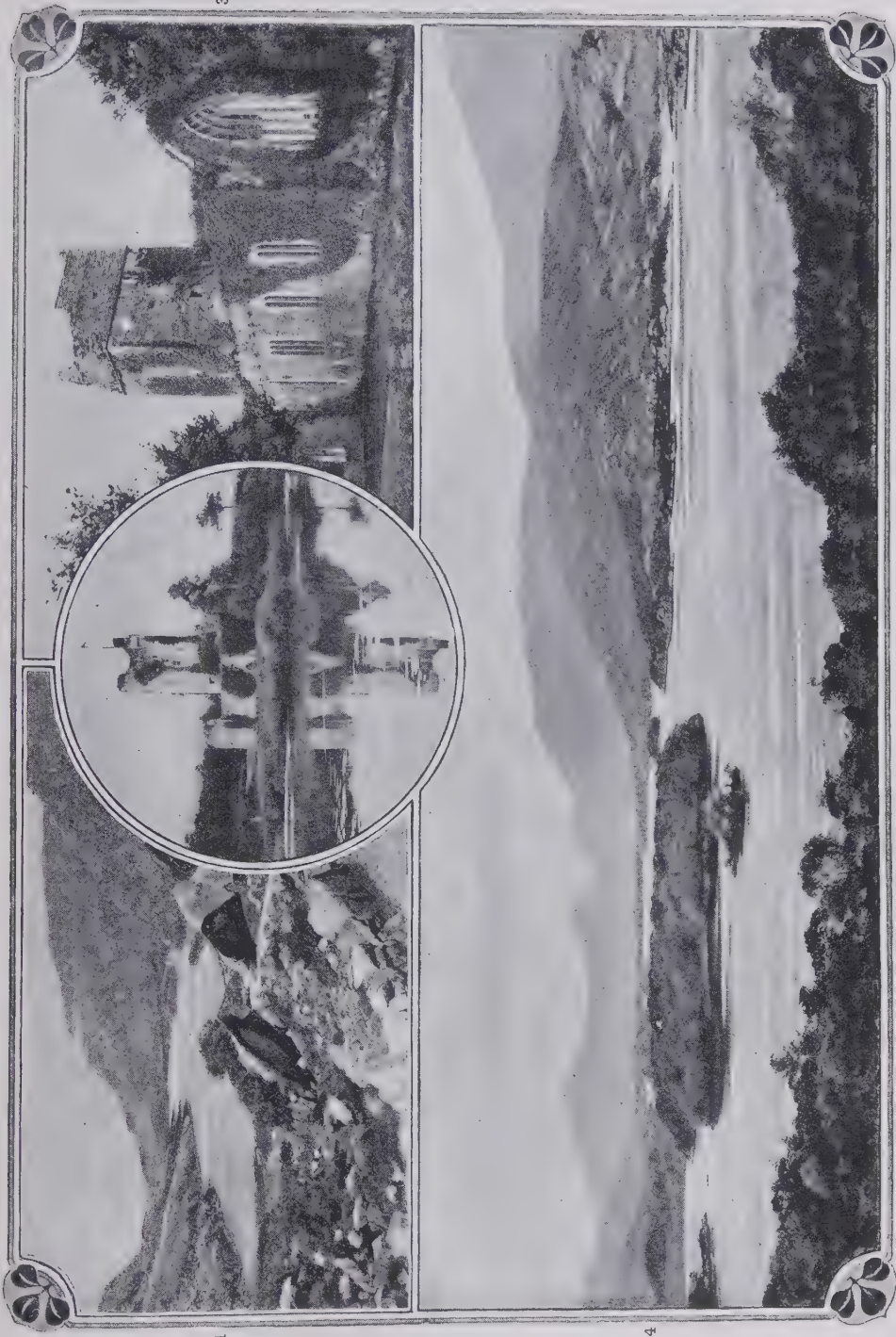
Killarney. (1.) Market tn., Co. Kerry, Ireland, 20 m. S.E. of Tralee. It is the tourist centre for the lakes. The Roman Catholic cathedral is a handsome modern building. At Aghadoe, 2½ m. W.N.W., are remains of a curious old church, formerly the seat of a bishop, and near it are ruins of a round tower and a castle. Pop. (1901) 5,656. (2.) LAKES OF, group of three connected lakes in Co. Kerry, Ireland, famous for the beauty of their scenery and the luxuriance of the vegetation, among which the arbutus is noted. Lower Lake or Lough Leane, the largest, 5½ m. long, is set in greenery and framed about with mountains, including Macgillieuddy's Reeks. The lake is drained to Dingle Bay by the Leane or Laune. It contains some richly-wooded islands, including Ross and Innisfallen, the former immortalized by Thomas Moore, and with a picturesque castle, the latter containing slight vestiges of the abbey in which was compiled the *Annals of Innisfallen*. Middle or Muckross Lake (680 ac.) is separated from Lough Leane by Muckross Peninsula (on which are the remains of Muckross Abbey). Near the N. shore rises Torc Mt., and farther north Mangerton (2,756 ft.), with a deep tarn called the Devil's Punch Bowl. A winding channel, 2½ m. long, connects Muckross with the Upper Lake (430 ac.), about five feet higher. It has several islands, and is almost entirely enclosed by lofty mountains. The Gap of Dunloe is a wild pass, 4 m. long, between Purple and Tomies Mts. on the E. and the Reeks on the W.

Killiecrankie, PASS OF, Perthshire, Scotland, in the valley of the Garry, 3 m. S.E. of Blair Atholl. At the N. end of the pass was the scene of the battle fought between Claverhouse and Mackay on July 27, 1689. Wade's road, formed in 1732, passes along the E. slope of the pass. The Highland Railway, constructed in 1863, runs between the road and the river. The pass begins near Killiecrankie Station, and extends about 1½ m. to Garry Bridge,



Agriculture is the chief occupation. Flour, whisky, and beer are manufactured. Coal (anthracite) is mined and black marble is quarried. The county returns three members to Parliament. Kilkenny is rich in antiquities—cromlechs, raths, ruins of ancient castles and ecclesiastical buildings, including the abbey of Jerpoint, near Thomastown. Area,

churches of St. John and St. Mary are both ancient, and two monasteries date from the 13th century. The Tholsel (market house) has a curious cupola. At the grammar school (1684), Swift, Congreve, and George Berkeley were educated. The name 'City of the Confederation' is derived from a rebel Catholic Parliament which assembled here in 1642.



Scenes in Killarney.

1. Gap of Dunloe. 2. Ross Castle. 3. Muckross Abbey. (Photos by Lawrence.) 4. The Upper Lake. (Photo by Grey.)

Killigrew, THOMAS (1612-83), English dramatist, born in London, son of Sir Robert Killigrew, became page to Charles I. (1633), and the companion of Charles II. in exile. He was British resident at Venice (1651), and groom of the bedchamber and queen's chamberlain, after the restoration. Proprietor of a playhouse, he also was master of the revels, and managed the king's company. His plays are not of much note. A collected edition of his works appeared in 1664.

Killigrew, SIR WILLIAM (1606-95), English dramatist, elder brother of Thomas Killigrew, was gentleman-usher to Charles I., and suffered for his adherence

to marnock waters, 12 m. N.E. of Ayr. Its industries are tweeds, carpets, and shoemaking, but the chief works are engineering shops and foundries. The more important institutions include Burns's monument and the Dick Institute. With Dumbarton, Port Glasgow, and Renfrew and Rutherglen, it returns one member to Parliament. Dean Castle, a ruin (destroyed 1735) stands N. of the town. Pop. (1901) 35,091.

Kiln. See CEMENT, LIME, POTTERY.

Kilogram. See METRIC SYSTEM.

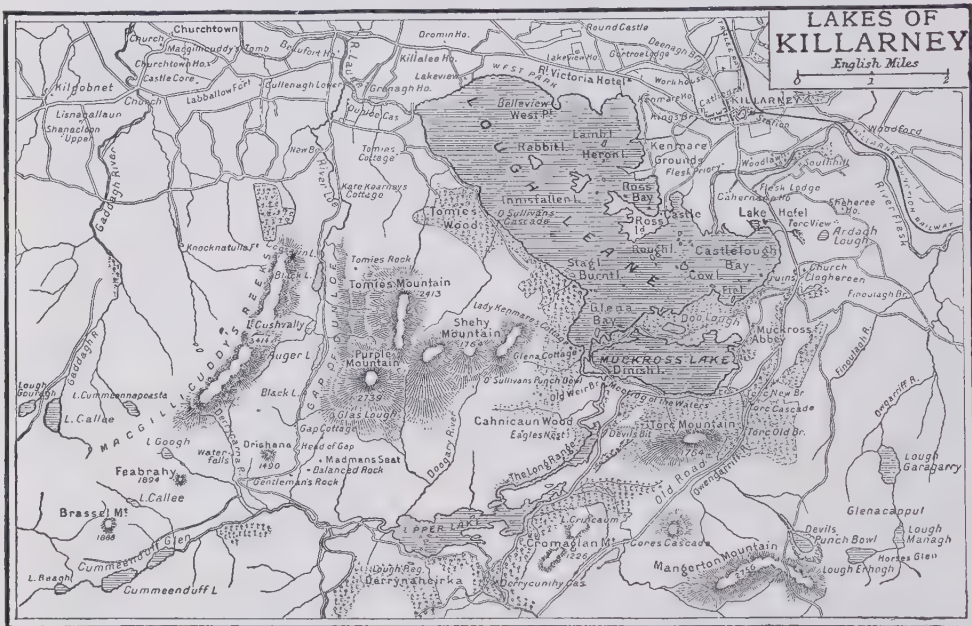
Kilpatrick, OLD, par. and vil., Dumbartonshire, Scotland, 10 m. N.W. of Glasgow, is supposed to

be the birthplace of St. Patrick (387-458). Pop. of par. (1901) 27,443; of vil. (1901) 1,569.

Kilwa-Kisiwani, or **QUILOA**, seapt., German E. Africa, on an island 25 m. S.E. of Kilwa-Kivinje. The town and sultanate date from about 975 A.D. In 1505 it was stormed by the Portuguese. Pop. 600.

Kilwa-Kivinje is a thriving seaport of German E. Africa, 145 m. S. of Dar-es-Salaam, with a population of 8,000.

Kilwinning, tn. and par., Ayrshire, Scotland, 25 m. S.W. of Glasgow, with engineering, iron smelting and founding, coal-mining, and worsted-spinning indus-



try. It is the traditional birthplace of freemasonry in Scotland. Eglinton Castle, the scene of the famous Eglinton tournament in 1839, lies 1½ m. S.E. Pop. (1901) 4,440.

Kimberley. (1.) Chief town and diamond-mining centre of Griqualand West, Cape Colony, 646 m. by rail N.E. of Cape Town, and 914 m. S.W. of Bulawayo. Alt. 4,000 ft. It was named after the late Lord Kimberley, colonial secretary (1870-4), and was formerly known as 'Colesberg Kopje' and New Rush. Now the third largest town of British S. Africa, it has most of the features of a large modern city, such as several fine public buildings, churches, hospitals, sanatorium, free library, botanical gardens,

to the royal cause. Of his plays, *Pandora*, *Selindra*, *Ormasdes*, and *The Siege of Urbin* are best known. He was ruined by unsuccessful attempts to drain the Lincolnshire fens.

Kilmarnock, tn., Co. Dublin, Ireland, incorporated with the city of Dublin (1900). It contains the official residence of the commander-in-chief of the forces in Ireland, a royal military hospital, the county jail, and the court house. It is noteworthy as the scene of the so-called 'Kilmarnock Treaty' of 1882, said to have been made between Mr. Gladstone and Mr. Parnell, who was then imprisoned in the jail. Pop. 61,000.

Kilmarnock, tn., Ayrshire, Scotland, on the Irvine and Kil-

marnock waters, 12 m. N.E. of Ayr. Its industries are tweeds, carpets, and shoemaking, but the chief works are engineering shops and foundries. The more important institutions include Burns's monument and the Dick Institute. With Dumbarton, Port Glasgow, and Renfrew and Rutherglen, it returns one member to Parliament. Dean Castle, a ruin (destroyed 1735) stands N. of the town. Pop. (1901) 35,091.

Kiln. See CEMENT, LIME, POTTERY.

Kilogram. See METRIC SYSTEM.

Kilpatrick, OLD, par. and vil., Dumbartonshire, Scotland, 10 m. N.W. of Glasgow, is supposed to

be the birthplace of St. Patrick (387-458). Pop. of par. (1901) 27,443; of vil. (1901) 1,569.

Kilruth, par. and seapt., Co. Clare, Ireland, on the northern shore of the estuary of the Shannon, 25 m. S.W. of Ennis. It has slate quarries and fisheries. Pop. (1901) 4,179.

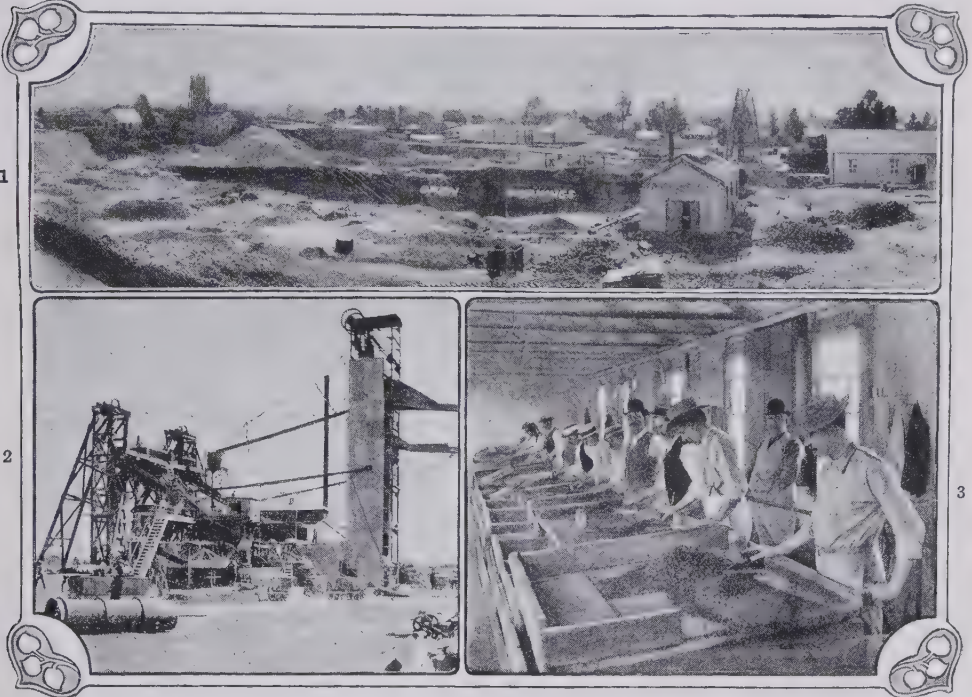
Kilsyth, pol. bur. and par., Stirlingshire, Scotland, 12 m. E. of Glasgow, has manufactures of cotton. There are coal and iron mines, and whinstone and freestone are quarried. Near it, in 1645, a battle was fought between Montrose and the Covenanters, in which the latter were almost annihilated. Pop. (1901) 7,292.

Kilt, that part of the Highlanders' national dress which envelops the body from waist to

public water-works supplied from the Vaal River, and electric lighting. It returns four members to the Cape Assembly. Pop. (1891) 28,718. In 1867 an ostrich hunter, named O'Reilly, came upon some diamonds which had been found on the banks of the Vaal. Two years later the 'Star of South Africa,' valued at £11,000, was found, and within four years ten thousand diggers were turning up the working in the wet or alluvial diggings along the banks of the river. Finally, the matrix of the diamonds was discovered in pipes or funnels of unknown depth, probably the craters of

by elaborate machinery. From the remaining gravel the stones are selected by 'assorters.' The supply is practically unlimited, but the output is regulated by the monopolistic De Beers Company, and has averaged over £4,500,000 annually. In 1905 it amounted to £5,472,690. The white employes occupy the model village of Kenilworth. Between 1867 and 1898 diamonds valued at £87,878,000 were exported. The mining is done by natives, who are confined to compounds during the term of their service. The chief mines are the Kimberley Mine, De Beers Mine, Bultfontein, Du Toit's Pan.

Kimberley, JOHN WODEHOUSE, FIRST EARL OF (1826-1902), British statesman; held office under Aberdeen, Palmerston, Rosebery, and Gladstone; and was leader of his party in the Upper House in 1897. He held nearly all the most important portfolios at one time or another, having been Secretary of State for Foreign Affairs (1852-6, 1859-61, 1894-5), Lord-Lieutenant of Ireland (1864-6), Lord Privy Seal (1868-70), Secretary of State for the Colonies (1870-4, 1880-2), Secretary of State for India (1882-6, 1892-4), Lord President of the Council (1892-4).



Views in Kimberley.

1. General view of St. Augustine's Diamond Mine. (From *South Africa*.) 2. Diamond-washing machinery, De Beers Mine. (Photo by N. P. Edwards.) 3. Searching tables, De Beers Mine. (Photo by G. W. Wilson & Co.)

ancient volcanoes. The surface of the diamond-bearing country is red sand, and below is a deposit of lime. Then comes the 'blue ground,' or diamond-bearing earth. At first the mines were shallow pits enlarged to immense holes a third of a mile across. The falling in of the surrounding rock and earth necessitated the sinking of shafts, by means of which the 'blue' is brought to the surface. It is then spread out on depositing floors, and exposed to the weather for some nine months until it crumbles to powder, after which it is washed

(See DIAMOND.) The influence of the diamond mines on South African history has been immense. On Oct. 15, 1899, Kimberley was besieged by the Boers, and was not relieved until Feb. 16, 1900. Beaconsfield—pop. (1891) 10,478—containing the Bultfontein Mine and Du Toit's Pan, lies 2 m. s.w. of Kimberley. (2.) Town, div. of W. Australia, watered by the rivers Ord and Fitzroy. (3.) Gold field, Kimberley div., W. Australia, 304 m. E. of Derby. The first gold was discovered in 1882. It covers an area of 47,000 sq. m.

Kimchi, DAVID (1160-1235), Jewish grammarian and commentator, was probably born at Narbonne, in S. France, where he lived and died. His grammar (1545) and lexicon (1490) are the basis of all similar subsequent work. He published many Old Testament commentaries, notably one on the Psalms, edited by Schiller-Szinessy (1885).

Kimmeridge Clay, a subdivision of the Jurassic system, a member of the Upper Oolitic series. As typically developed in the south of England, it is a dark bluish-gray clay, which is often

bituminous, and in the Isle of Purbeck contains oil shales that are combustible. Often the clay is more or less sandy, and it may contain large concretionary, septarian nodules. The whole formation is from 100 to 500 ft. thick, and is well developed in Yorkshire and in Dorsetshire, but much thinner in Oxfordshire. In Lincolnshire it is often full of large calcareous lumps or 'doggers,' which weather out prominently. Besides the dark bituminous shale or 'Kimmeridge coal' above mentioned, oil shales, alum, brick-clay, and cement are obtained from these rocks.

Kimpolung. See CAMPULUNG.

husband is not next of kin to his wife, or *vice versa*. Canon law reckons the degree of kinship between collaterals by counting the number of generations between the person farthest removed from the common ancestor and that ancestor: thus, first cousins are in the second degree, a great-uncle in the third degree. For this reason canon law forbids marriages between first cousins.

Kina-Balu. See BORNEO.

Kinburn, old fortress in Taurida gov., S. Russia, on the sandbank which separates the liman or estuary of the Dnieper from the Black Sea. Originally Turkish, it was ceded to Russia by the peace of Kuchuk-Kainardji in

Kindergarten. The word kindergarten is to be found in Jean Paul Richter, but the name and the thing alike, as we know them, originated with Friedrich Froebel, who in 1837 established at Blankenburg, in Central Germany, the first kindergarten. His aim in founding the institution is thus stated by himself: 'To take the oversight of children before they are ready for school life; to exert an influence over their whole being in harmony with its nature; to strengthen their bodily powers; to exercise their senses; to employ the awakening mind; to make them thoughtfully acquainted with the world of nature and of man; to guide their hearts and souls in a right direction; and to lead them to the Origin of all life and to communion with Him.' The system is based upon a metaphor. The school is the garden, the children are the plants. This metaphor of the plant is very prominent in Pestalozzi's theories, and is accepted by Froebel. The keynote of the kindergarten system is self-activity on the part of the pupil. He is to be allowed free scope to develop his own individuality. The teacher is to be a benevolent superintendent, who studies child nature, and contents himself with aiding that nature to develop itself. In Froebel's own words, 'Education, instruction, and teaching should in the first characteristic necessarily be passive, watchfully and protectively following, not dictatorial, not invariable, not forcibly interfering.' We must learn what nature wills, and do that. There arises here a difficulty in finding a place for the educator. If, as Froebel maintains, 'the still young human being, even though as yet unconsciously, like a product of nature, precisely and surely wills that which is best for himself, and, moreover, in a form quite suitable to him, and which he feels within himself the disposition, power, and means to represent,' then there does not seem much room for an educator who works from without. The difficulty is met by referring to an invisible and invariable third, to which educator and pupil are alike and equally subjected—in other words, to the organic unity of the universe, or to God. An educator has reached higher stages of the same process of development through which his pupils are passing. He is accordingly in a position to arrange matters so that that development may be aided and not hindered. This is the principle that underlies the very elaborate system of gifts and occupations that forms such a prominent part of the Froebelian scheme. The six



Kin, NEXT OF. According to Roman law, which is now adopted both by English and Scottish law, the next of kin are the nearest relatives of a deceased person, no distinction being made between paternal and maternal relatives, or between whole and half blood. The relationship is reckoned by degrees—i.e. parent and child are one degree, grandparents and brothers and sisters are two degrees, uncles or aunts three degrees, and first cousins four degrees. In each case the reckoning is to the common ancestor and then down. The Statutes of Distribution created an artificial class, who are termed next of kin, but only for purposes of intestate succession, A

1774; bombarded by the English and French fleets in 1855, and abandoned in 1860.

Kincardineshire, or THE MEARNS, maritime co., Scotland, on E. coast, between Aberdeenshire and Forfarshire. The W. and middle are occupied by the Grampians, while the N. belongs to the valley of the Dee, and the S.W. to the Howe of Mearns. The county is watered by the Dee, North Esk, and Bervie. Oats, barley, and wheat are the principal crops, while on the coast there is a fishing industry. Stonehaven is the capital. Area, 383 sq. m. The county returns one member to Parliament. Pop. (1901) 40,923.

Kinchinjunga. See KANCHANJANGA.

Froebelian 'gifts' are as follows: (1.) Six balls of coloured worsted, representing the primary and secondary colours. (2.) A wooden sphere, cylinder, and cube. (3, 4, 5, and 6.) Each consists of a large wooden cube divided up in various ways: for example, in the third gift the cube is divided into eight smaller cubes; in the remaining gifts the subdivision is carried further, and the parts include square, rectangular, and triangular prisms, as well as cubes.

A great deal of ingenuity is shown by kindergartners in inventing games in which these gifts are utilized. In the first two gifts the work is mainly perceptual (*anschaulich*). In the remaining four there is an increasing opportunity for the exercise

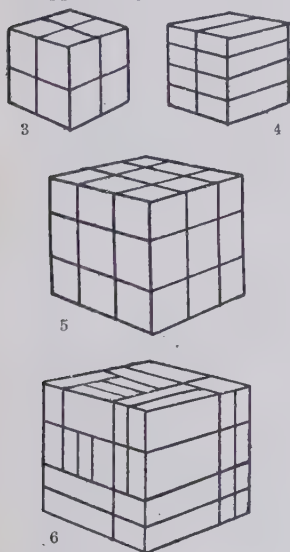
teachers. These include such things as beadwork, stick-laying, laths, sewing, paper-folding, paper-cutting, mat-plaiting, brushwork. There is a tendency to attach too much importance to the tangible results of these occupations, whereas their only educational value lies in the training they supply. Games and stories form an important part of the kindergarten system. Their main purpose is to encourage self-expression—to make the inner outer. There is a danger of this recreative side being overcultivated; in fact, the name play-schools is used in some districts as equivalent to kindergarten schools. Froebel himself probably attached too much importance to games, but not on their purely recreative side. The influence of German idealism and mysticism becomes manifest in the symbolism that he attached to games. In his *Mutter- und Kose-Lieder*, a book of songs, games, and stories for the use of mothers, he attaches undue importance to the moral aspects of certain motions and games: for example, he objects to the game of hide and seek, on the ground that it teaches deception.

While the kindergarten system has been received with favour in practically all civilized countries, there is everywhere a difficulty in fitting it into the national system of education. For this the chief cause is the cost of applying the system satisfactorily. A kindergarten requires highly-trained teachers, somewhat costly premises and apparatus, and *small* classes. Further, teachers of ordinary classes are somewhat suspicious of the work done in kindergartens. They maintain that there is too much play and too little real work. Everything, of course, depends upon what is meant by real work. It must be confessed that there is sometimes considerable difficulty in getting a kindergarten child to fit himself at once into the conditions of an ordinary school; but the question has not yet been settled whether the school should modify itself to suit the kindergarten, or *vice versa*. In the meantime, the better organized kindergarten schools recognize the difficulty of correlating their work with that of the ordinary school, and provide a transition class, in which pupils are weaned from purely kindergarten methods, and are prepared for those of the ordinary schools. If to this could be added the adoption of the kindergarten *spirit* in the junior classes of an ordinary school, the correlation of the two could probably be effected with the best results.

At present kindergarten meth-

ods are very largely adopted in the infant schools and departments under the Board of Education in England and Scotland. Unfortunately, the conditions of the case make it impossible to apply the method in its best form, and there is a certain danger that the letter of the system may be adopted without its spirit. Kindergarten methods mechanically applied lead to exceedingly bad results. On the other hand, if the system is sympathetically applied, even under conditions which render the best results impossible, it cannot fail to be a great improvement on the mechanical methods common under the hard-and-fast regulations formerly imposed by the Education Code. In Germany, Britain, and particularly in the United States, the kindergarten system is very widely adopted in the training of children of the well-to-do classes. The system was introduced into Britain in 1854, but it was not till twenty years later that it gained a firm footing. In 1874 the first lecturer on the kindergarten system was appointed by the London School Board. A kindergarten training college was established by the British and Foreign School Society at Stockwell, London, and the Froebel Society was founded. In 1887 the National Froebel Union was established, consisting of representatives of the Froebel Society, the Bedford Kindergarten Company, and the Home and Colonial School Society. The examinations conducted by this union have done much to raise the standard of training among kindergarten teachers, and to gain for the system the favour it now enjoys in this country. See Mary J. Lyschinska's *The Kindergarten Principle* (1880); Emily Shirreff's *The Kindergarten* (new ed. 1897), and several other books; Kate Douglas Wiggin's *The Kindergarten*, and several other books; H. Courthope Bowen's *Froebel and Education by Self-activity* (1893); William H. Herford's *The Students' Froebel* (1893); Bertha Marenholtz-Bülow's *The Child and Child Nature* (1879); the *Reports of the Froebel Society*, and its organ, *Child Life*.

Kinderscout Grit, a series of coarse gritty sandstones, from 500 to 1,000 feet in thickness, belonging to the lower part of the Millstone Grit of Yorkshire and Derbyshire. In Britain it forms many bold escarpments, and underlies the high table-land of Kinderscout. Between Wigan and Burnley, in Lancashire, a broad tract of moorland ground is composed of these rocks. They are extensively used for building, especially in work requiring large solid blocks.



Froebel's divided Cubes (Gifts 3, 4, 5, and 6).

of self-activity. In the earlier gifts the work is mainly, in Froebelian phrase, making the outer inner, while in the later gifts the process is mainly making the inner outer. With the small cubes and prisms the child is encouraged to make new combinations. These combinations fall into three classes: (1) forms of *beauty*—that is, those that are pleasing to the eye from symmetry and just proportion; (2) forms of *knowledge*, illustrating such matters as number and ratio; (3) forms of *life*, representing real objects, such as a train, a house, grandfather's chair. The gifts really illustrate what is best in the Froebelian theory, but there are many 'occupations' which, though of less educational value, are much more popular with



Kindergarten Work in London Schools.

1. Maypole drill, Fleet Road (Hampstead) L.C.C. School. 2. Wand exercise. (Photo by Bowden Bros.) 3. Dramatic game, 'Jack and Jill,' Denmark Hill L.C.C. School. 4. Action song, 'Little Flowers, awaken,' Fleet Road (Hampstead) L.C.C. School.

Kinematics, a preliminary department of dynamics, in which the geometrical properties of motion are considered independent of the mass of the moving matter, or of the forces associated with the motion. It is, in fact, an extension of geometry in which the element of time is introduced. Displacement, linear or angular, is a purely geometrical conception. When, however, we introduce the notion of time, we pass to velocity, linear or angular, and the question becomes a kinematical one. It is usual to preface modern treatises on dynamics with chapters on the kinematics of a moving point, a moving plane figure, and a moving rigid solid. The transition to the corresponding dynamic problems is at once effected by introducing mass as a factor. The case of the motion of a plane figure parallel to its own plane forms an important subdivision called uniplanar kinematics; and a little consideration of the moving parts of an ordinary engine will show how peculiarly important this department is in practical applications.

In uniplanar kinematics there is a fundamental theorem which asserts that any displacement of a plane figure in its plane may be effected by a rotation about a definite point: when the displacement is a pure translation, the point about which rotation takes place passes to infinity. For a body in *continuous* motion parallel to a plane, the motion at any instant may be represented by rotation about a point which is called the instantaneous centre of rotation. For example, in the case of a wheel rolling along the ground the instantaneous centre of rotation is always the point of contact of the wheel and the ground.

A corresponding theorem, more remarkable even, holds true in the case of a rigid body which has one point fixed. Any displacement of such a body may be effected by a rotation about a particular axis. Hence the continuous motion of a rigid body with one point fixed can be represented at every instant by a rotation about an axis. This axis is the instantaneous axis of rotation. The points of the body momentarily coincident with it are at rest. Thus, however complicated may be the motion of a rigid body with one point fixed, there is at every instant a row of particles at rest. This theorem may be illustrated by means of a spinning top.

If the rigid body is perfectly free, then clearly the motion may be regarded as compounded of a translation and a rotation; and in every such case it is possible to represent the motion as con-

sisting of a rotation round a definite axis, and translatory motion parallel to this axis. This is a screw motion. Thus, however complicated the motion of a rigid body may be, there is always at every instant a particular line in the body which is sliding along itself. This line forms the momentary axis of screw.

The kinematics of deformable figures forms a somewhat difficult branch of the subject, and is a necessary introduction to the motion of fluids, and to stress and strain in solids. (See ELASTICITY and HYDROKINETICS.) The simplest kind of deformation is that in which straight lines remain straight lines, and planes remain planes. The angles between sets of lines or of planes may, however, be changed. This is a homogeneous strain, and whatever be its character in detail, there is always one line which has not changed direction. Thus, in a substance undergoing deformation of this simplest character, there is at every instant a set of parallel lines which are not changing direction. See also VORTEX for a special type of fluid kinematics. See M'Cord's *Kinematics* (1883), M'Gregor's *Kinematics* (1887), and Ziwet's *Kinematics* (1893).

Kineshma, tn. and riv. port, Kostroma gov., Central Russia, 57 m. S.E. of Kostroma city, on the r. bk. of the Volga. Pop. (1897) 7,564.

Kinetics, the branch of applied mathematics which treats of the motions of material configurations, or, to speak more logically, of the motions of masses, where by mass we mean that abstract quantity which may be regarded as symbolizing a material body. The general division of the subject has already been discussed under DYNAMICS. Here we shall indicate a few of the great lines of development of the kinetics of the universe. The first to formulate a complete theory of kinetics was Newton. Previous to his work astronomy was kinematical, Kepler's laws of planetary motion being purely empirical, and based upon numerical comparisons involving only space and time. The Newtonian law of gravitation, on the other hand, involves the recognition of inertia, which is a property of matter, distinct from space and time. It is certainly remarkable that the motions of comets, planets, satellites, and double stars should all be coordinated in terms of one common attribute of all kinds of material things. During the 18th century laws almost identical in form with that of gravitation were found to hold for electrical and magnetic actions; and

during the 19th century kinetic theory has gradually permeated every department of physical science. Apart from the far-reaching problems of attraction, the most important lines of development are the investigation of vibratory and wave motion in systems of connected particles, and the discussion of the properties of crowds of small, quick-moving particles practically free from one another. The latter constitutes the so-called kinetic theory of gases, by means of which purely kinetic expressions are found for the temperature and pressure of a gas. In this theory nothing is assumed except mass, momentum, and kinetic energy, and the conservation of all three. Attempts have been made, but not, so far, with any great measure of success, to deduce, as a mathematical consequence, from these assumptions only as applied to the ultimate atoms which constitute the universe the whole variety of physical properties as we recognize them in the external world. It is not easy to see how the mutual bombardment of particles of different sizes can bring about a sufficient stability of configuration to ensure steady periodic fluctuations about this configuration of stability. In all investigations in vibratory and wave motion such a configuration is necessarily assumed, and with it a law of force acting on any chosen part. The forces may be mechanical, as in the case of elastic bodies; or they may be electrical and magnetic, as in Maxwell's great theory which makes light electrical. In all these cases the mere act of radiation in the form of wave motion through an ethereal medium will produce a mechanical force upon a body placed in the medium. This force is a repulsion from the radiating body. The amount of repulsion acting in this way upon the earth because of the solar radiation is very small compared to the gravitational attraction; but it can be shown that a small enough sphere in the position of the earth would experience a radiation repulsion comparable to, and even greater than, the attraction of gravitation. This gives a possible explanation of the manner in which comets' tails are, as it were, driven away from the sun.

The whole present trend of physical speculation is to regard the phenomena of nature as due to the interplay of moving particles of different kinds. Some of these are purely material, others are electrically charged particles. (See ELECTRON.) It seems to be necessary, however, to assume positional forces acting between pairs of these numerous corpuscles or atoms. Kelvin at

least has stated that there is no escape from the interatomic Bosovichian forces. This is a virtual admission that a thoroughgoing kinetic theory of the universe is impossible. See Gross's *Kinematics and Kinetics* (1884), and Ziwet's *Kinetics* (1894).

Kinetoscope. See CINEMATOGRAPH.

King and Kingship. See SOVEREIGNTY.

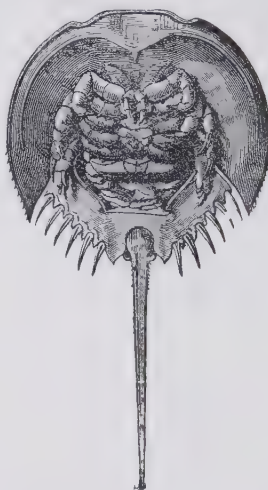
King, HENRY (1592-1639), English poet and divine, son of John King, bishop of London, was educated at Westminster and Christ Church, Oxford. He took orders, became a prebendary of St. Paul's in 1616, and archdeacon of Colchester in 1617. In the same year he married Anne Berkeley, who died about 1624. In 1624 he was made canon of Christ Church, in 1639 dean of Rochester, and in 1642 bishop of Chichester. He was a friend of Donne and of Izaak Walton, printed an occasional sermon, and wrote an occasional copy of elegant verses, in Latin or in English. In 1643 he lost the estates of his see, and lived until the end of the commonwealth, first with his brother-in-law, Sir Richard Hobart, at Langley, Buckinghamshire, and then at Ritchings, not far off. In 1660 he returned to Chichester. See *Poems, Elegies, Paradoxes, and Sonnets* (1637, 1634), in 1703 ascribed to Ben Jonson; *The Psalms of David* (1631, 1634, 1671). His religious verse was edited by J. Hannah (1843), with bibliography.

King, SIR RICHARD (1730-1806), English admiral, born at Gosport; saw active service in the E. Indies, and at the reduction of Geriah and Calcutta (1757). He was in command of the *Argo* at the reduction of Manila, where he captured a Spanish galleon of the estimated value of three million dollars. Then he took part in all the actions with De Suffren in 1782 and 1783. He was promoted to be admiral in 1795.

King, WILLIAM RUFUS (1786-1853), American statesman, born in N. Carolina; became a secretary of legation in Europe (1816-18), and subsequently helped to frame the constitution of Alabama. King was elected member of Senate (1819), was minister to France (1844), governor of Alabama (1848), president of Senate (1850), and vice-president of the United States (1852).

King-bird (*Tyrannus pipiri*), an American passerine bird belonging to the family of the tyrants, remarkable for its power of flight and bold black-and-white coloration. The male has a flame-coloured crest. The birds are exceedingly bold, and do not hesitate to attack birds of prey that venture to approach the nest.

King Charles's South Land, isl., Tierra del Fuego, S. America. It is generally low and level, but in the W. reaches 6,910 ft. in Mt. Sarmiento.



King-crab—under surface.

King-crab (*Limulus*), an interesting marine arthropod whose exact zoological position is not quite certain. There are several species, which live in shallow water on both sides of the Pacific Ocean, and off the eastern coast of America. The body is semi-circular, with a long spinelike tail. Anteriorly there is a large vaulted cephalothoracic shield, which is hinged to the pentagonal and unsegmented abdomen, while this in turn has a movable articulation with the spine. The under surface of the cephalothorax bears six pairs of appendages, an anterior pair of forceps or chelicere, and five pairs of walking legs. The walking legs send inwards large processes used in mastication, and, except the last, usually end in forceps; the last bears flattened blades used in digging. On the under surface of the abdomen are at each side a genital operculum, overlapping the other appendages, and five plates bearing the peculiar breathing organs, which are known as gill-books. The diet consists chiefly of worms and molluscs. The mouth lies beneath the chelicere, and is surrounded by the masticating plates of the legs. On the dorsal surface of the cephalothorax there are four eyes, and internally the organs seem generally to resemble those of the scorpion. The king-crab is probably related to the arachnids. There are not a few fossil representatives in Tertiary and Secondary rocks,

and such Palaeozoic forms as *Belinurus* are probably also related. Less closely connected are the fossil eurypterids and trilobites. The living king-crab and its fossil allies are usually placed in the order Xiphosura, which is sometimes appended to Arachnida, or with eurypterids and trilobites constitutes the class Palaeostraca. The larval *Limulus* recalls the fossil *Belinurus* in the segmentation of the abdomen, and superficially somewhat resembles a trilobite. The eggs are laid in the mud in shallow water during the summer, and the development is best known in the N. American *L. polyphemus*.

King Edward VII., British first-class battleship, launched at Portsmouth (1903), the type of the *King Edward* class, of which eight ships have been built—the *King Edward VII.*, *Dominion*, *Commonwealth*, *Hindustan* (1903), *New Zealand* (1904), *Britannia*, *Hibernia*, and *Africa* (1905). Their displacement is 16,350 tons; I.H.P., 18,000; speed, 18½ knots; and the armament includes four 12-in., four 9½-in., ten 6-in. guns, and four or five torpedo tubes.

Kingfishers, birds forming the family Alcedinidae of the Coraciiformes, or 'raven-like' birds. The colouring is, as a rule, brilliant. The head is large in proportion to the body, the bill long and stout, the wings, though powerful, are short and rounded, and the tail is also usually short. The British kingfisher falls into the sub-family of water-kingfishers, which feed upon fish and haunt shady streams; but the wood-kingfishers—e.g. the 'laughing jackass' of Australia—are not piscivorous, but feed upon insects, frogs, reptiles, and even small birds and mammals. In the water-kingfishers the eggs are laid at the end of tunnels excavated in the banks of streams or lakes, but the wood-kingfishers



Kingfisher.

lay theirs in holes in trees. Kingfishers are virtually cosmopolitan, but there are few in America, while they are specially abundant in the E. Indian Archipelago. As examples of wood-kingfishers may be mentioned the

beautiful racquet-tailed kingfisher (*Tanysiptera dea*) of the Malay region, with its contrasting tints of bright blue and white; the 'laughing jackass' (*Dacelo gigas*) of Australia; and the red and blue *Carcinectes pulchellus* of the Malay region. Water-kingfishers are exemplified by *Alcedo ispida* of Britain and Europe generally, and *Ceryle alcyon*, the belted kingfisher of N. America. The bright feathers of the British kingfisher are used in making artificial flies. The head, a stripe on the cheek, and the wings and tail are dark blue, slightly mottled, the back paler blue, the throat white, and the under surface, together with a cheek band, chestnut. The bill is black with an orange base, and the feet reddish. The female is slightly duller than her mate.

Kinghorn, royal and parl. bur. and seaside resort, with golf links, Fifeshire, Scotland, 3 m. s.w. of Kirkcaldy. It has shipbuilding and engineering yards. In 1286 Alexander III. fell over the cliffs near Kinghorn and was killed. At Kinghorn Ness extensive fortifications have been built to support those on the island of Inchkeith, 3 m. to the s. Pop. (1901) 1,550.

Kinglake, ALEXANDER WILLIAM (1809-91), English historian, born at Taunton. About 1835 he made an extended tour in the East, which he described in *Æthien* (1844), which became celebrated. He was a friend of Lord Raglan's, and from his papers prepared *The Invasion of the Crimea* (8 vols. 1863-87), a valuable though somewhat prejudiced work.

Kingo, THOMAS (1634-1703), Danish hymn-writer, became bishop of Fünen (1677). The first part of his famous *Aandelige Sjungekor* appeared in 1674, the second part in 1681. They did much to develop the Danish language, and are full of fire and inspiration. *Psalmes og Aandelige Sange* (1827) is the best edition. See Petersen's *T. Kingo og hans Samtid* (1887).

King-of-Arms, the title of the highest grade of official of the College of Arms in England and the Lyon Court in Scotland. See HERALD.

King Paradise Bird. See BIRD OF PARADISE.

Kings, THE FIRST AND SECOND BOOKS OF, were originally one book. In the Hebrew canon they are numbered among the so-called Former Prophets; in the Septuagint they appear respectively as 3 and 4 Kings. They narrate the history of Israel from the death of David till the dissolution of the southern kingdom (Judah) in 586 B.C., and thus cover a period of some four hundred years. The several reigns may be arranged in three great groups—(1) the

undivided monarchy under Solomon (1 Kings 1-11); (2) the separate kingdoms, Judah and Israel, till the destruction of the latter in 721 B.C. (1 Kings 12-2 Kings 17); and (3) the later history of Judah till the Babylonian captivity (2 Kings 18-25). The compiler has used various historical documents, and expressly names the 'Acts of Solomon,' the 'Annals of the Kings of Israel,' and the 'Annals of the Kings of Judah' as sources utilized by him. One of his characteristics is the use of stereotyped formulae to introduce and close a particular reign. Thus, at the beginning of each reign of the divided kingdom he gives the date of accession (fixed by a particular year of the contemporary king of the sister kingdom), the king's age, his mother's name, and an estimate of his character; and at the end the document in which the monarch's 'acts' are written, his death, and the name of his successor. In most cases, however, one or more of these details are omitted. The general colouring of thought and diction reveals the influence of the writer of Deuteronomy, and the work is not so much history as 'philosophy of history.' The date of composition is generally placed shortly before the captivity of Judah (say 600 B.C.); the concluding sections are by a later hand. See Commentaries by Keil (1865; Eng. trans. 1872), Klostermann (1872), Benzinger (1899), Lumby in *Camb. Bible*, Farrar in *Expos. Bible*.

Kings, THREE, OF COLOGNE. See COLOGNE.

King's Bench Division. See SUPREME COURT.

Kingsburgh, JOHN HAY ATHOLE MACDONALD, LORD (1836), lord justice-clerk of Scotland, and president of the Second Division of the Court of Session (1888), born in Edinburgh; became an advocate in 1859, and took silk in 1880; was solicitor-general for Scotland (1876-80); lord advocate (1885-8); dean of the Faculty of Advocates (1882-85). He has published a standard *Treatise on the Criminal Law of Scotland* (3rd ed. 1874), and works on electricity and military tactics. It was greatly through his influence that post cards came into use in Great Britain. Lord Kingsburgh has invented life-saving apparatus and electrical appliances.

King's College, situated in the Strand, London, was opened in 1831. In 1882 it was re-incorporated for the purpose of giving instruction in literature, science, and the duties and doctrines of Christianity as the same are inculcated by the Church of England. By the Amending Act of 1893 all religious tests as quali-

fications for office were removed, except in the case of professors and lecturers in the faculty of theology. In 1898, King's College was made a school of the university in all the faculties in which it affords instruction—namely, theology, literature, science, engineering, and medicine. There is also a department for the preparation of candidates for the civil service.

King's College, Cambridge. See CAMBRIDGE.

King's Counsel are appointed in England on the recommendation of the lord chancellor; in Scotland, since 1897, on the recommendation of the lord justice-general presented through the secretary for Scotland; in Ireland by the lord-lieutenant on the recommendation of the Irish lord chancellor; in the colonies by the various governors. The patent in England appoints a person 'one of our counsel learned in the law' to take precedence next after the junior K.C. above him. King's counsel may not act as counsel against the crown without special licence. They sit within the bar, and wear a silk gown, and in the House of Lords a full-bottomed wig. The first Q.C. was Francis Bacon. Till 1831 an allowance of £40 a year and stationery was attached to the office, so that the acceptance of it at that time vacated a seat in Parliament. To avoid this, patents of precedence were established, and afterwards the office ceased to be one of profit.

King's County, an inland co., prov. Leinster, Ireland. The N. part is occupied mainly by the Bog of Allen; in the s.w. are the Slieve Bloom Mts., with summits exceeding 1,500 ft. The Shannon borders the county on the w.; a large tract in the n. is drained by the Brosna; and in the w. are affluents of the Boyne and the Barrow. The Grand Canal crosses the county from E. to W. Agriculture employs most of the inhabitants. The county returns two members to Parliament. The most famous remains are the ruins of Clonmacnoise, Durrow, and Seirkieran. Area, 770 sq. m. Pop. (1901) 60,187.

King's Evidence, the evidence of an accomplice to a crime given upon an express or implied promise of pardon. Sometimes a free pardon is offered for evidence by proclamation in the *London Gazette*, but the more common practice is to admit accomplices to give evidence for the crown upon an implicit promise of pardon. The admission of the evidence of an accomplice is in the discretion of the court; but the court usually acts on the application of the counsel for the prosecution, who has considered the

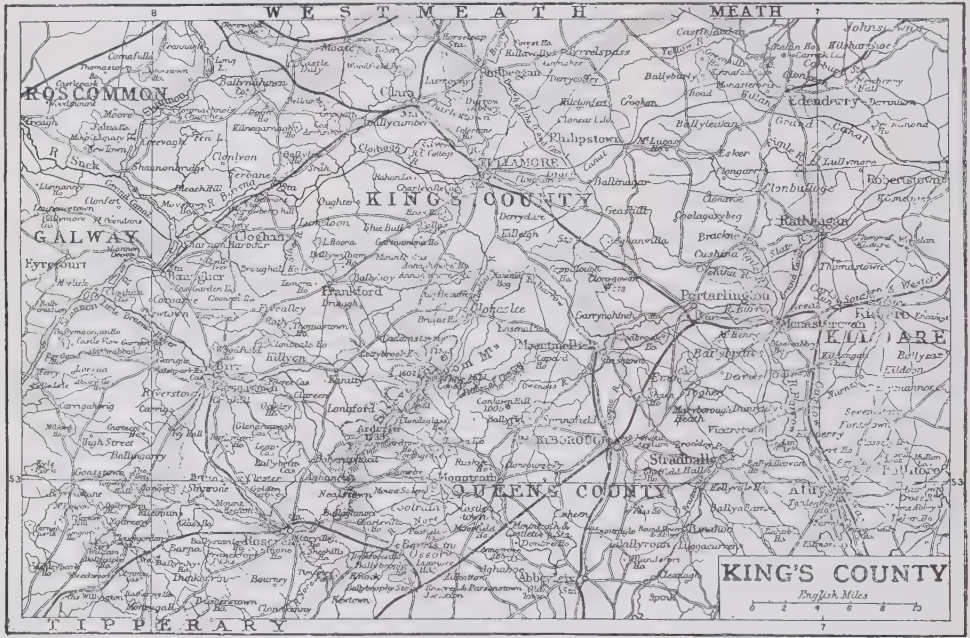
facts, and pledges his opinion that the testimony is necessary. As the promise of pardon is only implied, it is usual to direct an acquittal of the accomplice before he gives evidence, so that he may not be influenced by fear. In Scots Law the expression king's evidence is not used, but the public prosecutor has the right to call one *socius criminis* to give evidence against another, and may grant him absolute immunity from prosecution. See also AP-PROVER.

King's Evil, SCROFULA, or STRUMA, a morbid condition characterized by defective nutrition of the tissues, and often resulting in suppurating glands. Unfav-

Kingsford, WILLIAM (1819-98), Canadian historian, born in London; went to Canada and became journalist, and was proprietor of the *Montreal Times*. He entered the Department of Public Works, and surveyed for the Lachine Canal, and for the Hudson River, Panama, Grand Trunk, and Canadian Pacific Railways. Hewrote *The History of Canada* (10 vols. 1887-97) and *Canadian Archaeology* (1886).

Kingsley, CHARLES (1819-75), English author, born at Holne vicarage, Devonshire. He was for a time at King's College, London; then went to Magdalen College, Cambridge, where (1842) he graduated a first-class in clas-

(1857), a strong presentation of contemporary life; and *Here-ward the Wake* (1866), an entrancing historical novel. Kingsley was a patriotic Englishman, devoted to the best interests of his fellow-countrymen, and enthusiastic over the natural beauties and resources of his native land. *At Last* (1871) is an embodiment of the impressions received during a visit to the West Indies. In 1860 Kingsley became professor of modern history at the University of Cambridge. His revised lectures constitute the volume entitled *Roman and Teuton* (1864). In 1864, with characteristic impulsiveness, Kingsley assailed Newman in his provocative



ourable hygienic surroundings and insufficient food have much to do with its development in the young. In England, Edward the Confessor was the first to 'touch' for the evil; but the custom was observed in France at a much earlier period. In the English Church Prayer Book of Henry VIII. there was a special 'Healing Service.' The sovereign generally presented the patient with a piece of gold, which was often worn as an amulet. Queen Anne was the last to 'touch' for the evil, and amongst her patients in 1712 was Dr. Samuel Johnson; but even as late as 1745 Prince Charles Edward held a healing service in Edinburgh. See SCROFULA.

sics and a senior optime in mathematics. In 1843 he was appointed curate, and the following year rector, of Eversley, Hampshire. He also worked energetically for the Christian socialism of Frederick Denison Maurice. 'Muscular Christianity' he called his own interpretation of the creed, his practical exposition of it provoking both admiration and cavil. His stories *Yeast* (1848) and *Alton Locke* (1850) illustrate his principles and his views of popular rights. *Hypatia* (1853) displays the writer's doctrines from a historical standpoint, and is charged with his individuality at its best. The same qualities are in the powerful Elizabethan story *Westward Ho!* (1855); *Two Years Ago*

What, then, does Dr. Newman Mean? He thus provoked the composition of the powerful *Apologia pro Vita sua*. He became a canon in Chester cathedral in 1869, exchanging into Westminster Abbey in 1873. From 1835 onwards Kingsley wrote much verse. In 1848 appeared his *Saint's Tragedy*—massive and imposing, but destitute of genuine vitality. A volume of *Poems* was published in 1871; some of the shorter pieces—e.g. *Andromeda*, *Ode to the North-east Wind*, *The Three Fishers*—will endure. His essays will be found in *The Hermits* (1886); *Prose Idylls and Plays and Puritans* (1873); and four volumes of literary, sanitary, scientific, and his-

torical essays, which appeared in 1830. The children's books—*The Heroes* (1856), *The Water-Babies* (1863), *Madam How and Lady Why* (1869)—are distinguished in their kind. The Eversley edition of Kingsley's *Works* appeared in 1881-4, an edition of the novels was issued in 1888-9, and the novels and poems were published in 11 vols. in 1896. See Charles Kingsley's *Letters and Memories*, by Mrs. Kingsley (1877), and *Twenty-five Years of St. Andrews*, by Dr. A. K. H. Boyd (1892).

Charles Kingsley's daughter, MARY ST. LEGER HARRISON, has taken a place in letters under the pseudonym 'Lucas Malet.' Born at Eversley rectory in 1852, she published in 1882 *Mrs. Lorrimer, a Sketch in Black and White*, improving her position with *Colonel Enderby's Wife* (1885), *Little Peter* (1887), and *A Counsel of Perfection* (1888). Her strongest work is *The Wages of Sin* (1891). *The Carissima, a Modern Grotesque*, appeared in 1896, *The Gateless Barrier* in 1900, and *History of Sir Richard Calmady* (1901).

Kingsley, HENRY (1830-76), younger brother of Charles Kingsley, was in Australia from 1853 to 1858. In 1870-1 he edited the *Edinburgh Daily Review*. Colonial life is depicted in his fresh and vigorous *Geoffrey Hamlyn* (1859). His best novel is *Ravenshoe* (1862). His other novels include *Austin Elliot* (1863), *The Hillyars and the Burtons* (1865), *Silcoate of Silcoates* (1867), and *Grange Garden* (1876). Kingsley is not strong in his constructions, but he tells with distinction a good, straightforward, well-ordered story.

Kingsley, MARY HENRIETTA (1862-1900), English traveller and author, niece of Charles and Henry Kingsley, was born in London. She wrote the racy *Travels in West Africa* (1897), *West African Studies* (1899), and *The Story of West Africa* (in the Empire Series, 1900). She died at Simon's Town, S. Africa, and was buried at sea.

King's Lynn, LYNN REGIS, or LYNN, munic. and parl. bor. and seapt., Norfolk, England, 42 m. N.W. of Norwich, on the Great Ouse. On the opposite side is the suburb of West Lynn. The church of St. Margaret dates from about 1100, and the chapel of ease of St. Nicholas from the 14th century. In the town hall is preserved an ancient register, known as the 'Red Book of Lynn.' The grammar school was founded in the time of Henry VIII., and a tower remains of a 13th-century Franciscan friary. Outside the town is the curious Red Mount Chapel (15th century). Industries include corn mills, oil and cake mills, chemical and manure

works, malt works, breweries, jam factories, motor carriage, coach, and agricultural implement works, and iron and brass foundries. The fisheries are important. The harbour covers about 100 ac. Area (munic. and parl.), 3,100 ac. Pop. (1901) 20,288.

Kingsmill Islands. See GILBERT ISLANDS.

King's Norton, par. and tn., Worcestershire, England, adjoins Birmingham; has manufactures of paper, metal, and screw nails. The model village of Pournville, with the cocoa and chocolate works of Cadbury Brothers, Ltd., is situated in the parish. Pop. (1901), with Northfield, 57,120.

King's Printers are appointed by patent for the three kingdoms. The first King's printer was probably Grafton, appointed in 1547. Charles Eyre came into office in 1767, and founded the present firm of Eyre and Spottiswoode, H.M. Printers, to the members of which the patent has been renewed several times. The patent allows the printers to print all or some of the books in which the crown enjoys copyright. Copies of private acts, proclamations, orders in council, etc., printed by the King's printers, are made *prima facie* evidence of the contents of such documents, by the Official Documents Act, 1845, and the Documentary Evidence Act, 1868.

King's Proctor. Under the Matrimonial Causes Acts, 1860 and 1873, before a decree of divorce, or nullity of marriage, is made absolute (i.e. within six months of the decree *nsi*), the king's proctor may, on the information of any person and with the consent of the attorney-general, intervene when he suspects that the parties have been acting in collusion to obtain a divorce, or have been guilty of misconduct in the meantime. He may also intervene on the ground that material facts have not been brought before the court. If the intervention is successful, the decree is rescinded.

King's Regulations. The army and navy are each governed and administered by these regulations, which are issued in volume form. Each officer is supposed to have in his possession a copy of the latest edition of these, and to be thoroughly acquainted with its contents.

King's Remembrancer. See REMEMBRANCER.

Kingston. (1.) Capital of Jamaica, W. Indies, on the s. side (76° 47' W.) of the island. Its harbour admits the largest vessels. Pop. (1901) about 50,000. Four miles S.W. is the naval station of Port Royal, the headquarters of the British naval forces in the W. Indies. Old Port Royal, once the

most flourishing English city of the New World, stood near the present naval station. In 1693 it was destroyed by a terrible earthquake. (2.) City, prov. Ontario, Canada, occupies the site of Fort Frontenac, at the outlet of Lake Ontario, 161 m. E. of Toronto. It is strongly fortified, and contains the Royal Military College of Canada (1876). It is joined to Ottawa by the Rideau Canal, and has foundries, engineering workshops, breweries, and tanneries. It was the birthplace of Grant Allen and George Romanes. It was the capital of Canada for a brief period (1841-44). Pop. (1901) 18,043. (3.) City, New York, U.S.A., co. seat of Ulster co., on W. bk. of Hudson R., 85 m. N. of New York city. It trades in coal, stone, brick, lime, lumber, grain, and cement. Pop. (1900) 24,535.

Kingston, WILLIAM HENRY GILES (1814-80), English novelist, born in London, but lived some years in Oporto. His newspaper articles on Portugal helped the conclusion of the English and Portuguese commercial treaty. He wrote more than 150 tales of adventure. Among the best known are *Peter the Whaler* (1851) and *The Three Midshipmen* (1862).

Kingston-upon-Hull. See HULL.

Kingston-upon-Thames, municipal bor., Surrey, England, 12 m. S.W. of London. It includes Norbiton and part of Kingston Hill, and is connected by a handsome bridge with Hampton Wick. The parish church of All Saints dates from the 14th century. The old royal chapel, in which several of the Saxon kings were crowned, fell in 1730, but the coronation stone is preserved opposite the Court House. Benevolent institutions include the Royal Cambridge Asylum for Soldiers' Widows, Princess Louise Home for Girls, and Victoria Hospital. The Queen's Promenade and Canbury Gardens are ornamental grounds facing the river. The last encounter in the civil war took place here in 1648, when Lord Francis Villiers was slain. Area, 1,114 ac. Pop. (1901) 34,375.

Kingstown (formerly Dunleary). (1.) Town and mail-packet station, Co. Dublin, Ireland, 6 m. S.E. of the metropolis. The harbour, one of the finest in the United Kingdom, commenced in 1817 and completed in 1850, is protected by piers, enclosing an area of 250 ac. Kingstown is a yachting rendezvous and favourite winter resort. The passage from Holyhead to Kingstown occupies 2½ hours. Pop. (1901) 17,592. (2.) Seaport tn., on S.W. coast of St. Vincent, W. Indies, is the capital of the island, and exports sugar, rum, cocoa, arrowroot, and spices. Pop. about 5,000.

Kingsway, the name of the new thoroughfare which forms the principal feature in the great street improvement now in course of construction by the London County Council, for giving direct and easy communication between the Strand and Holborn. The improvement was authorized by the London County Council (Improvements) Act, 1899, which fixed the time for the completion of the work at August 1906. The rate of progress was, however, so rapid that the thoroughfare was opened for traffic by King Edward on Oct. 18, 1905. Kingsway—a name chosen to commemorate the fact that the improvement was carried out at the commencement of the reign of King Edward—has a length of about 1,700 feet and a width of 100 feet. It runs from a point on the southern side of High

King-tê-chen, tn., prov. Kiang-si, China, 86 m. S.E. of Kiu-kiang, the great centre of porcelain manufacture. Kaolin, or China clay, derives its name from the Kau-ling Hills, to the W.

King William's Town (locally called 'King'), tn., Cape Colony, on the l. bk. of Buffalo R., 29 m. W. by N. of East London. Capital of the old province of British Kaffraria. Pop. (1901) 7,226.

Kinkajou (*Cercoptes caudivolvulus*), a small American carnivore, with a long prehensile tail. The claws are long, powerful, and much curved. The animal is about the size of a cat, but has a narrow elongated body. It lives in wooded regions from Mexico to Brazil, and feeds on small mammals, birds, eggs, honey, and fruit. The habits are nocturnal, and the animals seem

Paul Rubens (1874). See *Life* in German by Henne-am-Rhyn (1883).

Kin-kiang. See CHIN-CHIANG-FU.

Kinning Park, dist., Lanarkshire, Scotland, on the Clyde, forming, since Nov. 7, 1905, the 23th ward of the city of Glasgow. There are important engineering works, biscuit, soap, and paint factories. It has grown up since 1860. Pop. (1901) 13,851.

Kino, the red juice obtained by incision from the stem of *Pterocarpus marsupium* of the order Leguminosae. After being dried in the sun it becomes a dark mass, that readily breaks up into small angular glistening grains, which are odourless, and when chewed colour the saliva red, and are of a strong astringent taste. The chief constituents are kinotannic acid and kino-red, which are partially soluble in water and almost completely in alcohol. Kino is largely used as an astringent, and also in the manufacture of red wines. Tincture of kino frequently gelatinizes; this is believed to be due to the presence of a peculiar ferment.

Kinross, tn., cap. of Kinross-shire, Scotland, on Loch Leven, 16 m. S.E. of Perth; has manufactures of cotton goods, shawls, and damasks. Pop. (1901) 2,136.

Kinross of Gasclune, JOHN BLAIR BALFOUR, FIRST BARON (1837-1905), lord president of the Court of Session and lord justice-general of Scotland, was born at Clackmannan. He was called to the Scottish bar (1861), and commenced a career of great industry, which culminated in his elevation to the highest post in the Scottish judiciary (1899). He represented the united counties of Clackmannan and Kinross (1880-99); was solicitor-general for Scotland (1880); lord advocate (1881-5), and also in the succeeding Liberal ministries of 1886 and 1892-5. Lord Kinross owed his high position at the bar chiefly to his remarkable memory, combined with an astonishing agility of mind, and a capacity for mastering rapidly the law and the facts of a case.

Kinross-shire, inland co. of Scotland, between Perthshire and Fifeshire, with an area of 87 sq. m. It is an open plain, surrounded by hills. Sixty-eight per cent. is cultivated, and much of it is adapted for cattle-rearing. Whitecraigs (1,492 ft.) is the highest hill, and Loch Leven the chief lake. The minerals are coal and basalt, fireclay and limestone. The chief antiquities are connected with Burleigh, Cleish, and Loch Leven. Chief tn., Kinross. The county, with Clackmannanshire, returns one parliamentary representative. Pop. (1901) 6,980.



Kinross-shire.

Holborn, opposite Southampton Row, in an almost straight line to Aldwych, the crescent which sweeps behind the Strand frontage from Wellington Street to near the Law Courts, and forms an important part of the Holborn to Strand improvement. The estimated gross cost of the complete scheme of improvements was £6,120,000; but the recoupment to be obtained by disposal of the surplus land was placed at £1,333,200, so that the net cost of the improvements to be defrayed out of the rates is £1,757,180. A tramway-subway is in course of construction from Theobald's Road, Holborn, to the Victoria Embankment, passing under Kingsway, Aldwych, and the Strand.

Kingswood, par. and vil., Gloucestershire, England, 3½ m. N.E. of Bristol, makes boots and shoes. Pop. (1901) 12,000.

to leap from tree to tree like monkeys.

Kinkel, JOHANN GOTTFRIED (1815-82), German poet, born at Oberkassel, near Bonn, and became (1846) professor of poetry and art at Bonn University. A friend of Geibel and Freiligrath, he published (1846) a remarkably popular epic, *Otto der Schütz*; and in the same vein appeared the stories in verse, entitled *Der Grobschmied von Antwerpen* (1872), *Margret*, and *Tanagra* (1883). For the part he took in the revolution of Baden (1849), he was arrested by the Prussians and imprisoned at Spandau; but escaped to England (1850), and later became a professor at Zürich (1866). Of several works his best were *Geschichte der bildenden Künste bei den christlichen Völkern* (1845), *Mosaik zur Kunstgeschichte* (1876), and *Peter*

Kinsale, tn. and seapt., co. Cork, Ireland, 19 m. s.e. of Cork, rises in steep terraces above the Bandon. The harbour, commanded by Charles Fort, is deep and sheltered. A party of Spaniards landed here in 1601 to aid the Irish. A fishery pier has been constructed. Pop. (1901) 4,250.

Kin-sha-chiang. See CHIN-SHA.

Kintyre, or CANTIRE, peninsular dist., Argyllshire, Scotland, is 42 m. long and from 4 to 11 m. broad. It is connected with the mainland by the isthmus of Tarbet. The chief industries are fishing, farming, and stone-quarrying.—MULL OF KINTYRE, promon-

the capital from that date until 1868. Kioto is noted for its magnificent temples, monuments, and Buddhist monasteries. The Mikado's or Imperial Palace covers an area of 26 ac. The most important industries are connected with the making of porcelain, faience, embroidery, brocades, and bronzes. The weaving and dyeing of silks is also largely carried on. The Imperial University, founded in 1875, and consisting of a university hall, colleges of law, medicine, science, and engineering, is supported by government. The Lake Biwa Canal, constructed in 1890, connects Lake Biwa with the Kamo-gawa R. Pop. (1898) 353,139.

Kipchacks, Mongol race which about the year 1240 were settled in Russia between the rivers Don and Ural. Their leader was Batu, a son of Jenghiz Khan, who fixed his golden tent near the Volga, from which the Kipchacks derived their name of the 'Golden Horde.' Under Batu's son, the nation took Cracow, and adopting Islam, became allies of Constantinople and Egypt. Their power dwindled in the 14th century, although the 'White Horde' or Eastern Kipchacks continued to flourish, and captured Moscow in 1382. They were entirely routed by Timur (Tamerlane) in 1390, and in the 16th century their power came to an end.



Kioto, the former capital of Japan.

tory, at s. end of Kintyre. It is only 13 m. from the Irish coast.

Kiøge Bay, BATTLES IN. Here a Dano-Dutch fleet, under Niels Juel and Cornelis Tromp, defeated the Swedes, on July 11, 1677. Another action, fought in 1710 between the Danes and the Swedes, is chiefly memorable for the self-sacrifice of Iver Hvitfeldt.

Kioto, KYOTO, or SAIKYO, former cap. of Japan, prov. of Yamashiro, Hondo Is., 30 m. n.e. of Osaka, on Kamogawa R., which divides the city into two unequal parts, and is for the greater part of the year a mere rivulet. The city was founded in 793 by Kuwama, and called Hei-an-jo, 'the city of peace.' It remained

Kiowas, N. American aborigines, typical Prairie Indians, whose original home appears to have been about the headwaters of the Platte R. Driven thence by the Cheyennes and Arapahoes, they occupied extensive tracts on the Upper Arkansas, and here formed a permanent alliance with the neighbouring Comanches. The Kiowas spoke an independent stock language noted for its harsh, guttural sounds, quite different from the Comanche. By the Medicine Creek treaty of 1867 both nations surrendered their hunting grounds, and were removed to the Kiowa, Comanche, and Wichita Reservation, Indian Territory, where the Kiowas still numbered 1,100 in 1900.

Kipling, JOHN LOCKWOOD (1837), English sculptor, author and illustrator, was born at Pickering, Yorkshire, and entered the Indian Civil Service (1867). He was principal of the Mayo School of Art, and architectural sculptor in the Bombay School of Art (1865-75). In the latter year he was appointed curator of the Central Museum in Lahore (a post he held till 1893), and headmaster of the Lahore School of Industrial Art. He has written a collection of Hindu and Mohammedan folk-tales entitled *Beast and Man in India* (1891), and has illustrated his son Rudyard Kipling's *First and Second Jungle Books* (1894-5), and *Kim* (1901).

Kipling, RUDYARD (1865), English novelist and poet, was born in Bombay, Dec. 30, 1865. He was educated in England at the United Service College, Westward Ho, experiences of his school days there being subsequently utilized by him in his tale of schoolboy life, *Stalky and Co.* (1899), in which tale he figures as 'Beetle.' In 1892 he went to Lahore as sub-editor of the *Civil and Military Gazette*. He was in India till 1899, and during these years wrote, for the most part as contributions to the *Allahabad Pioneer*, the stories afterwards published in volume form as *Plain Tales from the Hills*, *Soldiers Three*, *The Story of the Gadsbys*, *In Black and White*, *Under the Deodars*, *Wee Willie Winkie*, and *The Phantom 'Rickshaw*, and a volume of verses entitled *Departmental Ditties*. Before returning to England at the close of 1889 he made a tour in China, Japan, and America, and it was not long after his return that he published his first long novel, *The Light that Failed* (1891). The next six years were spent partly in England and partly in travel in America, S. Africa, Australia, and New Zealand. In the course of them he was married (1892) to Caroline Starr Balestier, with whose brother, Wolcott Balestier, he collaborated in a novel called *The Naulahka* in 1893. His other publications during this period were *Life's Handicap* (1891), *Barrack-room Ballads* (1892), *Many Inventions* (1893), *The Jungle Book* (1894), *The Second Jungle Book* (1895). Shortly after his return to England in 1896, he published a volume of poems, *The Seven Seas*; and his subsequent publications have been *Captains Courageous* (1897), *The Day's Work* (1898), *A Fleet in Being* (1898), *Stalky and Co.* (1899), *Kim* (1901), *Just-So Stories* (1902), *The Five Nations* (1903), *Traffics and Discoveries* (1904). In 1897 he was specially elected to membership of the Athenæum Club. Kipling's literary output, and its quality—seeing that at the present time (1905) he is only in his fortieth year—is very remarkable; and still more remarkable is the versatility of a writer who can range from the easy cynicism of *Plain Tales from the Hills* and *Departmental Ditties* to the realism of *Soldiers Three* and *Barrack-room Ballads*, the human charm of *Wee Willie Winkie*, the fantasy of *The Phantom 'Rickshaw*, the keen observation of *Many Inventions*, *Captains Courageous*, and *Kim*, the delicate imagination of the two *Jungle Books*, and the dignified poetry of such works as the 'Recessional,' 'M'Andrew's Hymn,' and the 'Envoi' in *The*

Seven Seas. If the latter poems and the *Jungle Books* represent Kipling at his highest, he is at his lowest in the almost brutal realism that occasionally disfigures his work in passages where his capacity for the forcible runs away with his discretion. His power of selective observation of absorbing detail in vast quantities, and retaining that which is essential, leads occasionally to another weakness which is displayed in a superfluous revelling in technicalities. But such tendencies notwithstanding, there has seldom been in the history of our literature a writer who has, at so comparatively early an age, showed himself possessed of gifts so varied or so full of possibilities.



Rudyard Kipling.

(Photo by Elliott & Fry.)

Kippis, ANDREW (1725-95), English nonconformist biographer, born at Nottingham, held charges in Boston, Dorking, and Westminster. He was subsequently tutor in the dissenting college at Hackney, London. He was a constant contributor to the *Monthly Review*, founded the *New Annual Register*, and edited the first and unfinished edition of the *Biographica Britannica* (1778-95). He also edited an edition of Dr. Lardner's *Works* in 11 vols. (1788), and a *Life of Dr. Doddridge* (1792).

Kiprensky, OREST (1783-1836), Russian portrait painter, born near Oranienbaum; his delight in colour was founded on a study of Rubens and Van Dyck. He shows unusual breadth of technique, bold drawing, and careful characterization. In the *Hermitage* is a fine portrait of his father; one of Captain Davydov, poet and military writer, in the St. Petersburg Academy of Arts; and a portrait of himself in the Uffizzi Gallery at Florence.

Kipu. See QUIPU.

Kiratpur, tn., Bijnaur dist., United Provinces, India, 42 m. N.E. of Meerut. Pop. (1901) 15,051.

Kirby, WILLIAM (1759-1850), English naturalist and entomologist, born at Withnesham, Suffolk. He was rector of Barham, Suffolk, and a prominent fellow of the Linnean Society. His *Monographia Apum Anglie* was published in 1802. The four volumes of *An Introduction to Entomology* were written conjointly with William Spence, and appeared in 1817-26. In 1835 the Bridgewater treatise *On the History, Habits, and Instincts of Animals* appeared. See J. Freeman's *Life of Kirby* (1852).

Kirchhoff, GUSTAV ROBERT (1824-87), German physicist, was born at Königsberg, became professor of physics at the universities successively of Breslau (1850-4), Heidelberg (1854-74), and Berlin (1874-87). From 1845 onward he published a number of valuable papers on electrical and dynamical subjects. Then, in 1859-60, his researches on radiation led him to the definitive establishment of the science of spectrum analysis. His *Untersuchungen über das Sonnenspektrum* (1862) was translated into English. He published further, *Vorlesungen über mathematische Physik* (1876), and *Gesammelte Abhandlungen* (1882-91).

Kirchhoff's Laws. See ELECTRIC CIRCUIT.

Kirghiz, properly KAZAK, a people widely spread over W. Central Asia, of Turkish blood, with a strong Mongol element, divided into two main groups—(1) Kirghiz Kazaks, (2) Kara-Kirghiz. The former inhabit the steppes of the Russian provinces of Ural, Turgai, Syr Daria, Akmolinsk, Semipalatinsk, and Semirechensk. They number about 2,747,000, and are a nomadic and patriarchal people. They are mentioned in Chinese annals from 9th century A.D. The Kara-Kirghiz, or Black Kirghiz, are found in the basin of Issik-kul, in the Syr Daria province, in Fergana, on the Pamir plateau, in Kulja, and in E. Turkestan. They are estimated to number about 340,000 in all. See Grodekow's *Kirgisen und Karakirgisen* (1886), and Zaleski's *La Vie des Steppes Kirghizes* (1865).

Kiria. See KERIYA.

Kirin, or GIRIN, (1.) Central prov. of Manchuria, with Korea and the prov. of Shing-king on the S. Well-watered and fertile, it produces pulse, millet, maize, wheat, barley, potatoes, and the poppy. Kirin is the capital. Area, 115,000 sq. m. (2.) Capital of above prov., at the head of navigation of the Sungari, 225 m. N. of Mukden. Pop. 90,000.

Kirkjath-jearim (Josh. 9:17, etc.), a town on the northern border of Judah, Palestine, where the ark remained for some years (2 Sam. 6:2). It was near Beth-shemesh, and east of the 'camp' or 'plain' of Dan.

Kirkjath-sepher, an older name for the Canaanitish town of Debir (Judg. 1:11).

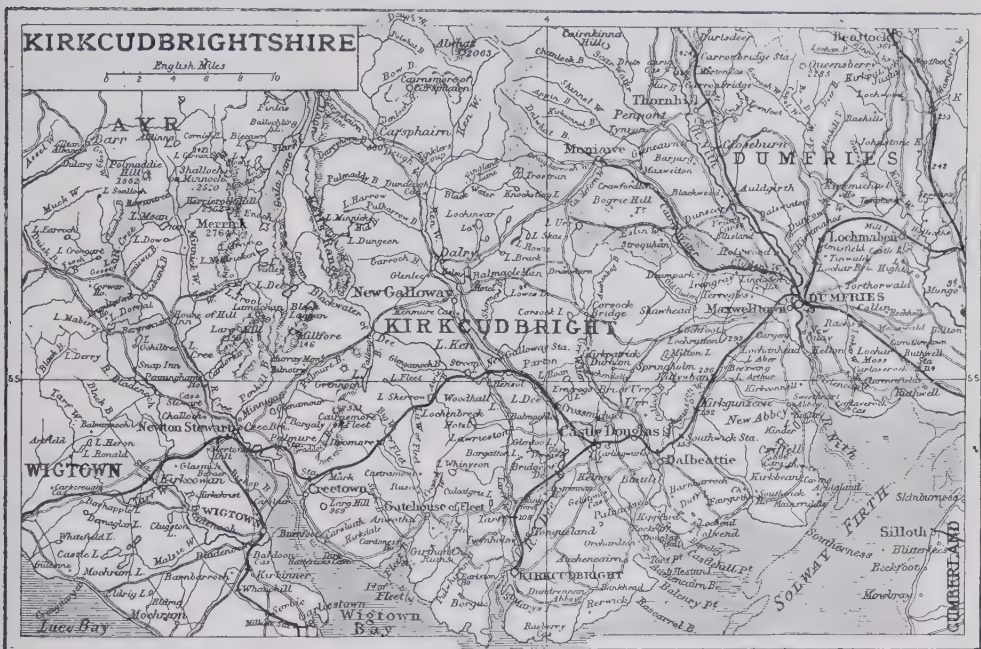
Kirk, **SIR JOHN** (1832), British administrator, was born at Edinburgh; served with distinction in Turkey during the Russian war; was medical officer and naturalist to Livingstone's African expedition; then political agent at Zanzibar (1886-7); British plenipotentiary to the African Conference at Brussels (1889-90);

of the floorcloth and lineoleum manufacture. Linen manufacture, bleaching, engineering, ironfounding, pottery making, and brewing are other industries. Kirkcaldy unites with Burntisland, Kinghorn, and Dysart in returning one member to Parliament. Adam Smith, author of *The Wealth of Nations*, was a native, and here Thomas Carlyle and Edward Irving were schoolmasters for some years. Coal and iron are extensively worked. Pop. (1901) 34,079.

Kirkcaldy, or **KIRKALDY**, **SIR WILLIAM**, OF **GRANGE** (d. 1573), Scottish soldier, who in 1546 took charge of the arrangements for the assassination of Cardinal Beaton.

mainly owing to his masterly generalship that she was defeated at Langside. After the conferences in England, his sympathies gradually veered towards the queen, and he finally decided to hold the castle of Edinburgh for the queen's party; but was forced to surrender on June 3, 1573, and, owing to the 'denunciation of the preachers,' he was, on August 3, executed at the Cross of Edinburgh. See Grant's *Memoirs and Adventures of Sir William Kirkcaldy of Grange* (1849), and Barbe's *Kirkcaldy of Grange* (Famous Scots Series).

Kirkcudbright, co. tn., parl. and roy. bur. of Kirkcudbrightshire, Scotland, on l. bk. of the Dee,



John Bartholomew & Sons

special commissioner to the Niger Coast (1895).

Kirkby Stephen, par. and mkt. tn., Westmorland, England, on Eden R., 9 m. S.E. of Appleby. Its church of St. Stephen dates from Saxon times. Copper, lead, coal, and ironstone are mined. Pop. (1901) 4,634.

Kirkcaldy, seapt., roy. and parl. bur., on S.E. coast of Fife-shire, Scotland, 10 m. N. of Edinburgh. The High Street is about four miles long, hence the derivation of 'the lang toon o' Kirkcaldy.' The principal buildings include the Adam Smith and the Swan Memorial Halls. Kirkcaldy has a small harbour, but a considerable extension is now in progress. It is the home

of the floorcloth and lineoleum manufacture. Linen manufacture, bleaching, engineering, ironfounding, pottery making, and brewing are other industries. Kirkcaldy unites with Burntisland, Kinghorn, and Dysart in returning one member to Parliament. Adam Smith, author of *The Wealth of Nations*, was a native, and here Thomas Carlyle and Edward Irving were schoolmasters for some years. Coal and iron are extensively worked. Pop. (1901) 34,079.

On the capture of St. Andrews Castle by the French, he was carried prisoner to France; but making his escape he took refuge in England. In 1557 he returned to Scotland, and in 1559 was specially active in the defence of Fife against the French. In 1562 he had an important share in the defeat of Huntly at Corrichie. With Moray he took up arms against the Darnley marriage in 1565, and after the failure to rouse the country against it sought refuge in England. Returning with Moray after Rizzio's assassination, he supported the Protestant lords against the queen on her marriage to Bothwell. It was to him she surrendered at Carberry, and it was

6 m. from the Solway Firth. The harbour is the best in the south of Scotland. Here are the ruins of Kirkcudbright Castle, and of Castledykes, the ancient stronghold of the lords of Galloway. Pop. (1901) 2,386.

Kirkcudbrightshire, or the **STEWARTRY OF KIRKCUDBRIGHT**, maritime co., Scotland, skirting the N. shore of the Solway Firth for some 50 m. The coast is irregular and rocky, and contains numerous caves, in former times the storehouses of smugglers (see *Guy Mannering*). The shire is mountainous, especially in the N.W., and from that quarter undulates towards the Solway. Mount Merrick (2,764 ft.) rises in the N.W., Criffel in the S.E.,

Cairnsmore of Carsphairn in the N.E. Cairnsmore of Fleet to the N.E. of Wigtown Bay. Granite is quarried. Only 33 per cent. of the area is under cultivation, the grassy uplands being more suited to the rearing of sheep and Galloway cattle. Pig-feeding and dairying are carried on. The chief town is Kirkcudbright. Area, 989 sq. m. Pop. (1901) 39,383.

Kirkdale Cave, limestone cavern, N. Riding, Yorkshire, England, $1\frac{1}{2}$ m. w.s.w. of Kirkby-Moorside; owes its fame to the discovery, in 1821, of fossil remains of mammals now extinct in Great Britain.

Kirke, PERCY (?1646-91), English soldier, colonel of 'Kirke's Lambs,' served under Monmouth, and was appointed to command at Tangier (1680). The regimental symbol, 'the Paschal Lamb,' provided the above nickname for his men, who, after Sedgemoor and Monmouth's defeat (1685), became a synonym for ferocity because of the treatment of the rebels. Kirke helped William III. against James, and raised the siege of Derry.

Kirkham, par. and mrkt. tn., Lancashire, England, 7 m. N.W. of Preston; has manufactures of cottons and linens. Pop. (1901) 3,693.

Kirkintilloch, par. and tn., Dumbartonshire, Scotland, 8 m. N.N.E. of Glasgow; has iron foundries, coal mines, and weaving factory. Pop. (1901) par. 14,401; bur. 10,502.

Kirk-Killiseh ('the town of forty churches'), tn., Turkey in Europe, 35 m. E. of Adrianople; has a trade in butter and cheese. It is the chief station on the traffic route between the capital and the Balkans. Pop. 16,000, of whom two-thirds are Bulgarians, and one-fifth Turks.

Kirkmaiden, par. in Rhinns of Galloway, Wigtownshire, Scotland, forming the southern extremity of Scotland. The greatest length in the kingdom is generally given as 'from Maiden-kirk to John o' Groat's.' Pop. (1901) 1,943.

Kirk-session. See PRESBYTERIANISM.

Kirkstall, eccles. par. and vil., W. Riding, Yorkshire, England, $2\frac{1}{2}$ m. N.W. of Leeds; famous for ruins of a Cistercian abbey dating from 1152. Here are iron works.

Kirksville, tn., Adair co., Missouri, U.S.A., 34 m. N. of Macon; has flour and woollen mills, and agricultural implement works. Pop. (1900) 5,966.

Kirkton, or KIRKTON in HOLLAND, tn., S. Lincolnshire, 4 m. S.S.W. of Boston. Pop. (1901) 2,236.

Kirkwall, seapt., parl. and roy. bur., and chief tn., Orkney, Scot-

land, on N.E. of Pomona. The cathedral of St. Magnus, dating from 1137, is built in Gothic and Norman styles. On the s. side are ruins of the bishop's palace and the earl's palace. Scott, in *The Pirate*, makes Cleveland meet Minna Troil in St. Magnus. There are two distilleries. Pop. (1901) 3,711.

Kirkwood, DANIEL (1814-95), American astronomer, was born in Maryland; became professor of mathematics at Delaware College (1851), and in 1854 president of the same. In 1856 he was appointed professor of mathematics at the University of Indiana. In 1891 he accepted the appointment of lecturer on astronomy at the Stanford University, California. He published (1867-88) *Comets and Meteors*, and *The Asteroids*. He anticipated, in 1861, the relationship between comets and meteors established in 1866; criticised effectively Laplace's nebular hypothesis; and explained the lacunæ in the distribution of asteroidal orbits, and in Saturn's ring system, by the commensurability of the periods of the missing bodies with those respectively of Jupiter's and Saturn's satellites.

Kirman. See KERMAN.

Kirmanshah. See KERMAN-SHAH.

Kirombo (*Leptosoma discolor*), a curious bird found only in Madagascar and the Comoro Islands. It is believed to be an aberrant roller, but resembles the frog-mouths in the presence of 'powder-down' patches on each side of the rump. 'Powder-down' feathers, it may be observed, are feathers which never fully develop, but continually disintegrate at their tips into a grayish powder. The kirombo—a native name—has its nostrils placed low down on the beak and covered by a horny plate, and its fourth toe is partially reversible, so that the foot is adapted for climbing. There is considerable difference between the sexes as regards coloration, the male having a metallic gloss absent in the female.

Kirriemuir, par. and mrkt. tn., Forfarshire, Scotland, 5 m. W.N.W. of Forfar; has linen manufactures. J. M. Barrie, a native, has immortalized it as 'Thrums.' Pop. (1901) 4,096.

Kirschwasser, or CHERRY-WATER, is prepared from both the fruit pulp and the stones of ripe cherries. Grain oil and water are used as the steeping medium for the crushed fruit, which after distillation is sweetened with cane sugar and bottled.

Kir-shehr, tn., Asiatic Turkey, on trib. of Kizil Irmak, 85 m. S.E. of Angora; is noted for its carpets. Pop. (1900) 9,000.

Kiryu, or KIRIU, tn., prov. Kotsuki, Japan, 60 m. N.W. of Tokyo; produces grapes, gauze, satin, and a kind of silk resembling taffety. Pop. (1898) 23,991.

Kisfaludy, KAROLY (1788-1831), Hungarian dramatist, born at Tet, co. Raab. He is regarded as the founder of the national theatre. His best works are *The Tartars in Hungary* (1814) and *The Student Matthias*. German translation of both in Gaab's *Theater der Magyarren* (1820).

Kisfaludy, SANDOR (1772-1844), Hungarian poet and man of letters, the elder brother of Karoly, born at Sümeg, Zala co. His most celebrated works are *Himfy's Love* (1807) and *Legends of the Olden Time in Hungary* (1807), and the historical dramas *János Hunyadi* (1825) and *Ladislaus the Cumanian* (1825).

Kisfaludy Society, a Hungarian literary academy, established in 1837, in honour of the brothers Kisfaludy, has done much for the national literature.

Kishangarh, feudatory state in Rajputana, India, with an area of 874 sq. m., and a population in 1901 of 2,658,666. The state produces cotton, for the spinning and weaving of which factories have been started. The chief town has the same name, and stands 18 m. N.E. of Ajmere. Pop. (1901) 12,663.

Kishinev, cap. of Bessarabia, S.W. Russia, 96 m. W.N.W. of Odessa. The high or new city stands on a hill 740 ft. above sea-level; the low town, or old Kishinev, lies on the r. bk. of the Byk, an affluent of the Dniester. Brandy, leather, soap and candles, and woollen stuffs are made here. Jews form an exceptionally large element of the population. Massacres of the Hebrew community took place here in 1904, and again in 1905. Pushkin, the Russian poet, resided here from 1820 to 1823. Pop. (1897) 108,796.

Kishm, tn. at E. end of island of same name, in Strait of Ormuz, Persia, 16 m. S. of Bender Abbas. It yields salt and sulphur. The island has an area of over 500 sq. m. Pop. of island, 15,000; town, 500.

Kishon, the river of Central Palestine which drains the plain of Esdraelon, and falls into the Bay of Acre. Here Sisera was defeated (Judg. 4: 7, 13), and Elijah destroyed the prophets of Baal (1 Kings 18: 40).

Kiskörös, mrkt. tn., Hungary, co. Pest, 67 m. by rail S.E. of Budapest; birthplace of the poet Petöfi (1823-49). Pop. (1900) 9,263.

Kiskunhalas, Hungary. See HALAS.

Kiskunmajsa, tn., Hungary, co. Pest, 30 m. S. of Kecskemet. Pop. (1900) 14,314.

Kismayu, coast dist. of British E. Africa, bounded on the N. by the equator, and on the s.w. by Tanaland. Kismayu Bay (Refuge Bay) is the most northerly anchorage on the E. coast of Africa to which the name of harbour is applicable. On the N. shore is Kismayu town. A small concession of land (5 ac.) for a landing stage and right-of-way was granted by Britain to Italy on lease in 1905.

Kismet (Pers. *kusmut*; Ar. *kismeh*), a word used by Mohammedans for 'fate' or 'destiny.' One of the leading precepts of Mohammed was that the decree of God, as preordaining the whole of a man's life, both here and hereafter, must be submitted to by the faithful with absolute resignation. Such a doctrine, apparently paralyzing to human endeavour, has had among the Mohammedans precisely the opposite effect, having been the chief inspiration of that almost unexampled courage which won for their religion its early triumphs, and made it one of the great spiritual powers of the world. See MOHAMMEDANISM.

Kissing, a custom peculiar to Caucasians, and unknown to yellow and black races; originated in a maternal caress, and developed into the expression of affection, friendship, reverence, and love, according to Professor Lombroso (*Pall Mall Magazine*, August 1899). From the Roman custom of greeting friends by kissing arose the kiss of peace, as a symbol of Christian brotherhood. See Nyrop's *The Kiss* (trans. by W. F. Harvey, 1901).

Kissingen, wat.-pl. of Bavaria, prov. Lower Franconia, on the Franconian Saale, 14 m. by rail N.N.W. of Schweinfurt, with saline baths (51°3' F.). Pop. (1900) 4,757.

Kistna, or KRISHNA. (1.) River of S. India, rises in the W. Ghats at an altitude of 4,500 ft., flows s.e., and breaking through the E. Ghats empties itself by two main outlets into the Bay of Bengal, after a course of 800 m. It is unnavigable for the greater part of its course, but is of great use for irrigation, and is connected by a canal with the Godavari. Its drainage area is computed at 97,050 sq. m. (2.) District on E. coast of the Madras Presidency, India, with area of 84,715 sq. m., and a population in 1901 of 2,154,803. Masulipatam is the capital.

Kistvaen. See CIST.

Kisujszallas, tn., Hungary, co. Jasz-Nagykun-Szolnok, 46 m. s.w. of Debrecen. Pop. (1900) 13,214.

Kit, of a soldier, applies in the stricter sense only to 'necessaries'—i.e. his underclothing, towels, and such things as brushes, knife, fork, razor, holdall, mess-tin, cleaning materials, etc. The

recruit is provided with a complete set of these necessities, free of charge, on joining, but must keep up the kit, complete and in good order, at his own expense afterwards. He is allowed two-pence a day to assist him in this. In a looser way, however, the word 'kit' is often used as including also the soldier's outer garments, which he is given gratis at yearly intervals. A 'sea kit' is issued to soldiers ordered on foreign service.

with a dash of statesmanship—a general whom I even suspect of genius' (Edinburgh, Nov. 1, 1902). He has had a remarkably distinguished and successful military career. 'Six years ago,' Mr. Balfour stated in the House of Commons on June 6, 1902, 'he was a colonel in the British army. He has now the highest military rank under that of field-marshal. He has been made first a baron, then a viscount. After what I hope will be done by the house



Lord Kitchener of Khartum.

(Photo by Duffus Bros., Johannesburg.)

Kit-cat Club, a society founded by Jacob Tonson (1703), ostensibly to encourage literature and the fine arts, but really to promote the Hanoverian succession. The club derived its name from meeting at the house of Christopher Cat. Sir Godfrey Kneller painted three-quarter length portraits of the forty-three members; hence the term 'kit-cat portraits' for figure paintings of this size.

Kitchener of Khartum, VISCOUNT (1850), commander-in-chief in India (1902), has been described by Lord Rosebery as 'a general

this afternoon, he will twice have been voted sums of money out of the public exchequer. He is the commander-in-chief designate of our Indian empire. These are great rewards, and yet I do not think that anybody who looks back at Lord Kitchener's career will say that he is overpaid for the services which he has rendered to us.' Sir Henry Campbell-Bannerman, on the same occasion, traced his career 'from the early days of patient work in the exploration of Palestine; of the duties, irksome at times, which

he undertook on the Red Sea littoral, in the execution of which he displayed a singular aptitude for winning the confidence of men of other races than his own and of conciliating them; through those laborious years of service in Egypt, culminating in the brilliant Sudan campaign, down to the day when, as chief of the staff, he set his foot in S. Africa. Lord Kitchener,' he added, 'went to S. Africa with the confidence of his fellow-countrymen. He has now (after the declaration of peace) earned their admiration and their gratitude.' These general surveys may be supplemented with a few details. Horatio Herbert Kitchener, the eldest son of the late Lieutenant-colonel H. H. Kitchener and of Miss Chevallier, of Aspell Hall, Suffolk, entered the Royal Engineers in 1871, after passing through the Royal Military Academy, Woolwich. He was engaged on the Palestine survey from 1874-8, and from 1878-82 on the Cyprus survey. He then went to Egypt, where he remained till he had achieved the reconquest of the Sudan (1898), and was ordered to S. Africa as Lord Roberts's chief of staff (1899). During the intervening sixteen or seventeen years he was fully employed fighting and organizing. He commanded the Egyptian cavalry (1882-4); took part in the Nile expedition (1884-5) for the relief of General Gordon, when he gained brevet rank of lieutenant-colonel; was governor of Suakin (1886-8), adjutant-general of the Egyptian army (1888-92); wounded at Handub (1888); commanded a brigade at the battle of Toski (1889), and was rewarded with a C.B.; and sirdar of the Egyptian army (1892-9) in succession to Lord Grenfell. He commanded the Dongola expeditionary force in 1896, and for his services was promoted major-general and created K.C.B. The crowning triumph of his arduous work in Egypt, and of the labours of the British officers who had been associated with him, was reached in 1898, when, at the Atbara (April 8) and Omdurman (September 2), he routed the dervishes and completely destroyed the power of Mahdism. Queen Victoria raised him to the peerage in recognition of his great victories, and Parliament voted him a sum of £30,000, and, by formal resolution, thanked him 'for the distinguished skill and ability with which he planned and conducted the campaign on the Nile of 1896-8, which culminated in the battle of Omdurman, the capture of Khartum, and the overthrow of the power of the Khalifa' (June 1899). Mr. Balfour, in proposing the grant, described Kitchener as 'the or-

ganizer of victory,' as 'a man whose foresight never was at fault'; while Sir H. Campbell-Bannerman characterized the complete success he had achieved under the conditions as 'constituting one of the most brilliant pages in the history of British arms.' During a flying visit to England on the conclusion of the Sudan campaign, Lord Kitchener raised £100,000 for the foundation of an educational college at Khartum in memory of General Gordon. He reached S. Africa with Lord Roberts on Jan. 10, 1900. He assumed supreme command on November 29, and waged war against the Boers by a system of 'blockhouses' and extensive 'drives,' till he secured an honourable peace on May 31, 1902. King Edward sent him a congratulatory telegram on the termination of hostilities, and raised him in the peerage to a viscountcy. Parliament voted him a sum of £50,000, and thanked him for his great services to the empire. Lord Kitchener returned to England on July 12, 1902, and proceeded to India to take up his new command in the following November. In 1902 he was placed on the establishment of generals.

Kitchen Garden. See GARDENING.

Kitchen-middens, KITCHEN-MOUNDS, SHELL-MOUNDS, or SHELL-HEAPS, are terms used by archaeologists to denote the domestic refuse-heaps of certain primitive races. They were first studied by the Danish professors Forchhammer, Steenstrup, and Worsaae (whence their earliest name *kjökken-mødding*), who published the result of their investigations in 1860, and placed in the museum at Copenhagen many thousand specimens of the objects found. The long mounds then examined had been previously supposed to be natural raised beaches. 'True raised beaches, however,' observes Lord Avebury, 'necessarily contain a variety of species; the individuals are of different ages, and the shells are, of course, mixed with a considerable quantity of sand and gravel. But it was observed that in these supposed beaches the shells belonged entirely to full-grown or to nearly full-grown individuals; that they consisted of four species which do not live together, nor require the same conditions, and would not therefore be found together alone in a natural deposit; and thirdly, that the stratum contained scarcely any gravel, but consisted almost entirely of shells.' Rude implements of stone, bone, and wood, fragments of pottery, and broken animal bones were the objects found in the heaps; and in a number of

cases the explorers came upon hearth-stones bearing the marks of fire. It accordingly became apparent that these mounds had been formed by a primitive race, and were simply the débris of their daily meals, flung from them as they ate. The largest heaps were about 1,000 ft. in length by 200 ft. in breadth, and 10 ft. deep. Many were of much smaller dimensions. The formation of such kitchen-middens is a process still going on among primitive peoples—notably among the Eskimos; and it is instructive to note that the process may be very rapid, as shown by Petroff's description of what he saw among the Aleuts, as quoted by Professors Keane and Windle:—'A family of three or four adults, and perhaps an equal number of children, will leave behind them a shell monument of their voracity a foot or eighteen inches in height after a single meal. The heaps of refuse created under such circumstances during a single season were truly astonishing in size. They will surely mislead the ingenious calculator of the antiquities of shell-heaps a thousand years hence.' It will be seen, then, that kitchen-middens may belong to any period of man's history, and need not denote a very prolonged residence in their neighbourhood of the race who reared them. The rudeness of the great majority of the implements found in the heaps, and the kind of life otherwise implied, point to people in a low state of civilization. Thus, the Danish mounds might be mementoes of the savage Fenni described by Tacitus, as they wandered from camp to camp along the Baltic shores. In his consideration of the shell-heaps of Japan, Mr. J. Milne is inclined to ascribe them to the aboriginal Ainu, for the reason that the human tibiae frequently found in them are platyemic, and many living Ainu show marked platyemism. Kitchen-middens are very numerous in America, from Alaska to Tierra del Fuego, both on the Pacific and the Atlantic coast; and the Marquis de Nadaillac (*Pre-historic America*) speaks of some in Florida that are more than 40 ft. high. (For views of the Florida mounds, see United States National Museum *Proceedings*, 1893, No. 966.) In Europe they are found along the coasts of the British Isles, Denmark, France, Portugal, and Sardinia. See Lubbock's *Prehistoric Times*, Brinton's *Artificial Shell Deposits of the United States*, and *Proc. Soc. of Antiquaries*.

Kitchin, GEORGE WILLIAM (1827), was born at Naughton in Suffolk; dean of Durham (since 1894), and warden of the uni-

versity; was censor of non-collegiate students at Oxford (1868-83); dean of Winchester (1883-94); has published *Catalogue of Manuscripts in Christ Church Library* (1867); the *Arundel Society's Life of Pope Pius II.* (1881); *Winchester* (1890), and a *Life of E. H. Browne, Bishop of Winchester* (1895); *Ruskin in Oxford* (1904); and *History of France Previous to the Reformation* (4th ed. 1899-1903).

Kite, a term which, though strictly applicable only to the true or red kite (*Milvus iclinus*), known in Britain as the glead, is also used to designate other members of the genus *Milvus*, and is even generally applied to a group of birds of prey distinguished from the buzzards by the long forked tail, elongated wings, short metatarsus and toes, and claws only of moderate length. The red kite, once abundant in Britain, is now on the verge of extinction. The head is whitish, streaked with dark brown, the



Kite, or Glead.

upper surface red-brown, and the lower rusty-red. The bird is a very miscellaneous feeder, but depends largely on offal. The nest is usually placed in a tree, and consists of a mass of sticks lined with rags and paper; the eggs are three to four in number. The total length of the body is rather over two feet, but though the flight is singularly easy and graceful, the bird cannot be reckoned among the powerful species. It is widely distributed throughout Europe, while the black kite (*M. migrans*) is a more southern form, migrating to S. Africa in winter. Other species occur in Africa and Asia. The beautiful swallow-tail kite (*Elanoides furcatus*) of America is chiefly black, with purple and green reflections, and is remarkable for its wonderful agility on the wing. It feeds chiefly on reptiles, while the kites of the genus *Milvus* usually act as scavengers in the regions in which they occur.

Kite. The first use of kites for scientific purposes, so far as is

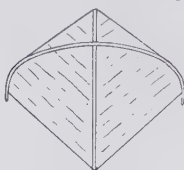


FIG. 1.—Java Kite.

known, was in 1749, when Dr. Alexander Wilson and Thomas Melville raised into the clouds thermometers attached to kites. Franklin's famous experiment of collecting the electricity of a thunder-cloud by means of a kite was performed three years later at Philadelphia. Modern scientific kite-flying may be said to date from 1883, when Douglas Archibald, in England, fastened anemometers to the kite wire, and so registered the wind movement at various elevations up to 1,200 feet. The experiments made by Franklin in 1752 were repeated in 1885 by Alexander M'Adie at Boston, U.S.A., with the addition of an electrometer. In 1889, and again in 1892, he measured simultaneously the electric potential at the base and summit of Blue Hill, and, with kites as collectors, at several hundred feet above the hill top. Eddy of Bayonne, New Jersey, in 1890 used an ordinary kite to raise thermometers, but soon discarded this for a tailless kite devised by himself. This resembled the Java kite (Fig. 1). The convex surface exposed to the wind enables a tail to be dispensed with (Fig. 2). In August 1894 Eddy at Blue Hill, Boston, sent up a thermograph 1,500 ft. above the summit, and so obtained the first automatic record of temperature by a kite. After that the records obtained from the meteorograph included data relating to barometric pressure, temperature, humidity, and wind velocity. Soon the Eddy or Malay kite was discarded for the cellular or box-kite invented by Laurence Hargrave of Sydney,



FIG. 2.—Eddy Tailless Kite.

N.S.W. These kites (Fig. 3) generally have two rectangular

cells covered with nainsook cloth, except at the top and bottom, and one is secured above the other by four or more sticks. Some of the kites stand 9 ft. high, have 70 sq. ft. of lifting surface, and weigh only eleven pounds. The kites are flown singly or in tandem (Fig. 4). Steel piano wire is used instead of cord, and as much as 32,000 ft. is coiled around a drum driven by steam power. By this means kites have raised meteorographs

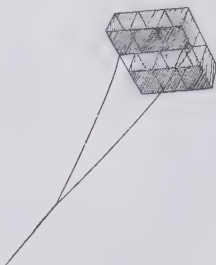


FIG. 3.—Hargrave Kite.

to altitudes of over three miles. The general results of over two hundred records from kites flown

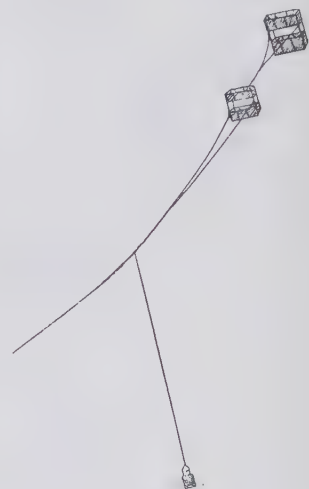


FIG. 4.—Kites carrying Meteorograph.

at Blue Hill Observatory are succinctly summarized by Mr. Rotch, the director, in *Quart. Jour. Roy. Met. Soc.*, xiv. p. 250. He shows that the wind's velocity steadily increases with elevation, thus confirming the measurements made upon clouds. The decrease of temperature with height varies under different conditions. On cloudless days the fall of temperature during the first mile is at the rate of 1° for each 180 ft. of ascent. On cloudy

days the fall is at this rate until the base of the clouds is reached. In the cloud the reduction of temperature with height is slow, while above the cloud it is still slower. The diurnal change in temperature in the free air almost entirely disappears at about 2,500 ft., although it is well marked on mountain stations at 6,000 ft. and upwards. On calm nights, however, the air near the ground is often much colder than at the height of a few hundred feet. The relative humidity, as a rule, varies inversely with the temperature. As night approaches, it increases near the ground, but diminishes at an altitude of 3,000 ft. The great practical importance of kite records in the United States lies in the information which they give of coming weather changes which are first felt in the upper air. To facilitate weather forecasts, the United States Weather Bureau has equipped sixteen observing stations with kite appliances, to obtain daily synoptic data at the height of a mile in the free air, while many of the meteorological bureaus in Europe have organized systematic kite flights. Recently the work has been taken up in Scotland. Military kites are chiefly of two kinds. A small one is used to carry a camera for photographing a fort or intrenched lines from above, the shutter being worked by electric wire or by clockwork. A larger kite, or preferably (by Major Baden-Powell) several kites coupled together, are used to lift a man up to, say, from 50 to 100 ft., for purposes of reconnoitring. The entire apparatus is cheaper, lighter in weight, and more expeditious than a balloon. These kites have been used in the British, United States, and other armies, and in the British navy. In Japan the sport of kite fighting is much practised, the object aimed at being to manipulate one kite so as to disable or cut the string of another. See Rotch's 'Sounding the Ocean of Air,' in *Annals of the Astronomical Observatory of Harvard College*, vol. xlii., part 1; *Monthly Weather Review*, U.S.A. (May 1896); Department of Agriculture Weather Bureau, *Bulletin F. Report on the Kite Observations of 1898*.

Kits Coity House. See DOLMEN.

Kittiwake Gull (*Rissa tridactyla*), a sea-gull characterized by the absence of the hind toe. It is resident in the British area, and breeds in large colonies in certain localities on narrow ledges of rock. It measures fifteen inches in length, and in summer is white and gray above, and white below, with black tips to some of its

wing primaries. The legs are black, a distinction from the related *R. brevirostris* of the N. Pacific, which has orange legs and feet. See GULL.



Kittiwake Gull.

Kitto, JOHN (1804-54), English Biblical scholar, born at Plymouth. He was apprenticed to a Plymouth dentist, who assisted him to publish his *Essays and Letters* (1825). He afterwards edited *The Cyclopædia of Biblical Literature* (3rd ed. 1863-66), and published *The Pictorial Bible* (new ed. 1855-6), *History of Palestine* (new ed. 1859); *The Lost Senses* (1845); *Journal of Sacred Literature* (1848-53). See *Memoirs* by J. E. Ryland (1856).

Kitui, dist., British E. Africa, to the E. of Kikuyu dist. The land is generally fertile. A station has been opened at Nengea, about 75 m. N.E. of Machakos.

Kitzingen, tn., Bavaria, prov. Lower Franconia, on the Main, 49 m. N.W. of Nuremberg; has breweries. Pop. (1900) 8,489.

Kiu-fow. See K'UH-FU.

Kiu-kiang, treaty port, prov. Kiang-si, China, on r. bk. of Yang-tse-kiang, about 10 m. above the outlet of Po-yang Lake. The delicate teas of Kiang-si were formerly shipped thence direct to Europe, but are now sent to Shanghai (445 m.) or Hankow for sale. Besides its teas, porcelain from Kiu-tê-chên is an important export. A large sanatorium has sprung up since 1896 at Ku-ling in the mountains about 4,000 ft. above Kiu-kiang. Pop. (1901) 62,000.

Kiung-chow, treaty port (opened in 1876) and chief city in island of Hainan, off coast of prov. Kwang-tung, China; is 3½ m. from its port Hoi-how. Chief exports, sugar, sesamum, grass-cloth, pigs, and poultry. Net value of annual trade about £800,000. Pop. (1901) 35,000.

Kiushiu, or KIMO, the most southerly of the four large islands of Japan proper, separated from Korea by the Strait of Korea, and from Nippon or Honshiu by Shimonoseki Strait and part of the Inland Sea. The area (including smaller islands) is 16,840 sq. m., and the population (1898) 6,811,246. The coast of the large island is much indented, especially on the w.; the interior

is mountainous and volcanic. Hot springs and *solfataras* are frequent. Rice, wheat, millet, beans, hemp, tea, and tobacco are produced. The production of coal is rapidly increasing, especially round Karatsu and in the island of Takashima, 8 m. S.W. of Nagasaki. Antimony is found in the S.E. Copper is mined, and tin is said to be abundant in the E. and S.W. The provinces of Hizen and Satsuma are celebrated for pottery, the latter for crackled faience. The chief harbour is Nagasaki.

Kivu, lake in Central Africa, crossed by 2° S., 60 m. N. of Lake Tanganyika. It lies at an altitude of 4,850 ft., and is very deep. In the centre is the large island of Kijwi.

Kiwi. See APTERYX.

Kizil Irmak, or HALYS, the largest river in Asia Minor, rises in the Karabel-dagh, from 70 to 80 m. E. of the town of Sivas. It flows W., N., and N.E., describing a deep curve, and falls into the Black Sea between Sinope and Samsun. In early days it marked the line of division between the Aryan races of W. Asia Minor and the Semitic or Hamitic races to the E., and it was the frontier of the empire of Croesus. The Delphic oracle foretold that if he crossed it he would destroy a great empire; that empire proved to be his own. Its length is 550 m., and it is all but useless for navigation.

Kizil-kum, desert tract of Russian Central Asia, stretching between the Amu Daria and Syr Daria, and between the Aral Sea and the Kara-tau highlands, over 200 m. from N. to S., and nearly 380 m. from E. to W. It is a sandy waste, sprinkled with saksaul and a few spiny shrubs.

Kizlyar, tn., Caucasus, Terek prov., on the l. bk. of Terek. A fort was erected here in 1735. The place is noted for its fruit and wine. General Peter Bagration (1765-1812) was born here. Pop. (1897) 7,324.

Kjerulf, HALFDAN (1818-68), Norwegian musical composer, born at Christiania. His choruses for male voices and his compositions for the piano command deserved attention, but he is best known in Britain by his melodious settings of songs, an English edition of which was published in 1883.

Kjölen Mountains. It was formerly supposed that Sweden and Norway were separated by a mountain range, the Kjölen or Keel. As a matter of fact no such range exists; and the Scandinavian mountain system consists of a vast plateau, intersected in every direction by numerous deep valleys—not a continuous chain.

Kladderadatsch, the chief humorous newspaper of Germany; is illustrated, and is published weekly in Berlin. It was founded in 1848 by Albert Hoffmann.

Kladno, tn., Bohemia, Austria, 19 m. by rail w. of Prague; has iron and coal mines, iron furnaces, and iron and steel works. Pop. (1900) 18,600.

Klado, NICHOLAS LAWRENTIE-VITCH (1861), an ex-captain in the Russian navy whose violent anti-English articles attracted some attention during the Russo-Japanese war. He was appointed chief of staff to Admiral Skrydlof at Vladivostok during the earlier stages of the war, and was with Vice-Admiral Rodjestvensky at the time of the 'North Sea incident' (October 1904). He has written two standard works on naval tactics, upon which he is regarded as one of the greatest living authorities. He was dismissed the navy on account of his writings in May 1905.

Klagenfurt, tn. and cap. of Carinthia, Austria, 114 m. by rail n. by E. of Trieste. It is an episcopal see; and among its notable buildings are the 16th-century cathedral, the Museum Rudolphinum, and the provincial assembly house. The chief manufactures are leather, white lead, machines, tobacco, and cloth. Pop. (1900) 24,314.

Klamath, riv., California, U.S.A., rises in Klamath lakes in S. Oregon, and after a circuitous course through the Cascade and Coast ranges, which it pierces in cañons, reaches the Pacific in 41° 32' N. Its length is 270 m., and its drainage basin extends to 14,660 sq. m.

Klang, chief seaport of the British protectorate of Selangor, in Malay Peninsula, 12 m. from the mouth of the Klang R.

Klapka, GEORGE (1820-92), Hungarian general, a native of Temesvár; joined the Hungarian revolutionists in 1848, and won the victories of Kápolna, Izsaszeg, Nagy-Sarló, and Komorn over the Austrians. He wrote *The National War in Hungary and Transylvania* (1851); *The War in the East* (1855); and *Memoirs of the War of Independence in Hungary* (1850 and 1886).

Klaproth, HEINRICH JULIUS (1783-1835), German orientalist and traveller, was born at Berlin; became known by the publication of *Asiatischer Magazin* (1802, etc.), and was interpreter in the Russian embassy to China. As the result of a scientific mission to the Caucasus, he published *Archiv für die Asiatische Literatur, Geschichte, und Sprachkunde* (1810). In 1816 he was appointed professor of Oriental languages in Paris, and published there *Asia Polyglotta* (1823), and *Aperçu Gé-*

éral des Trois Royaumes (1833). See Landresse's *Notice Historique et Littéraire de Klaproth* (1835).

Klaproth, MARTIN HEINRICH (1743-1817), German chemist, was born at Wernigerode. He discovered uranium, titanium, and zirconium; advanced the theory of the conservation of mass by his careful quantitative work; and, besides memoirs on specific subjects, published *Beiträge zur chemischen Kenntniss der Mineralkörper* (6 vols. 1795-1815).

Klattau, tn., Bohemia, Austria, at E. foot of the Bohemian Forest, 30 m. by rail s. of Pilsen; produces machinery, cloth, and beer. Pop. (1900) 12,793.

Klausenburg, Hungary. See KOLOZSVAR.

Klausthal, or CLAUSTHAL, mining tn., Prussian prov. Hanover, in Harz Mts., 19 m. by rail s. of Goslar; is the centre of one of the principal mining districts (silver and lead) of Germany, and has a famous mining academy. It virtually forms, however, one community with Zellerfeld (pop. 4,396). Pop. (1900) 8,565.

Kléber, JEAN BAPTISTE (1753-1800), French general, was born at Strassburg. Joining the republican forces, he was commander in the Vendéan war, distinguished himself at Fleurus (1794), captured Maestricht, and defeated the Austrians at Altenkirchen (1796). He was general of division in Egypt (1798) under Bonaparte, and played a prominent part in the Syrian expedition, winning the battle of Mount Tabor (1799). He was assassinated at Cairo by a Turkish fanatic. See *Life*, in French, by Pajol (1877).

Kleist, EWALD CHRISTIAN VON (1715-59), German poet, born near Köslin; served under Frederick the Great, and was mortally wounded at Kunersdorf. His best-known poem is *Der Frühling* (1749). He was a close friend of Lessing. A complete edition of his works was issued in 1880-2. See *Life*, in German, by Karl Einbeck (1861).

Kleist, HEINRICH VON (1777-1811), German dramatist of the romantic school, was born at Frankfurt-on-Oder. He was harassed till the day of his suicide, beside Wan Lake, near Potsdam, by his inability to achieve his literary ideal. He left at least five plays—*Der zerbrochene Krug* (1806), *Penthesilea* (1808), *Das Käthchen von Heilbrunn* (1810), *Die Hermannsschlacht* (1810), and *Der Prinz von Homburg* (1810)—and one tale, *Michael Kohlhaas* (1808), which have won a permanent place in German literature, chiefly in virtue of their freshness and clarity, and in part their happy characterization. There are good editions of his *Gesammelte Schriften* by Tieck

(new ed. by Schmidt, 1891) and by Karl Siegen (1895; new ed. 1900). See *Lives* by A. Wilbrandt (1863) and Brahm (3rd ed. 1892).

Klepts, the bands of Greeks who, in the 15th century, carried on a system of guerrilla warfare against the Turkish conquerors of their country. Later they developed into ordinary brigands.

Kleptomania is a manifestation of insanity, in which the patient is possessed by an irresistible impulse to steal. The symptom is most frequently found in women, and sometimes occurs in relation to pregnancy, in which case it is scarcely more than an exaggeration of those cravings which are so common as to be considered almost normal. Kleptomaniacs often exhibit a history of hereditary insanity. In other cases, inquiry reveals that the patient has suffered from fits or from alcoholism.

Klerksdorp, tn., Potchefstroom dist., Transvaal Colony, British S. Africa, 118 m. w. of Johannesburg. Here is a continuation of the W. Rand gold fields. Pop. (1904) 4,235.

Kleve, or CLEVES, tn., Prussian prov. of Rhineland, 40 m. by rail N.N.W. of Krefeld. It is a Dutch-looking place, formerly capital of duchy of Kleve. The castle of the former dukes, with which the legend of the Knights of the Swan (Lohengrin) is associated, is now converted into law courts and jail. The large palace of Pruzenhof was built by Prince Maurice of Orange in 1664. Agricultural implements and tobacco are made. Henry VIII. of England married (1539) Anne, daughter of John, Duke of Cleves. Pop. (1900) 14,678.

K.L.H., Knight of Legion of Honour.

Klinger, FRIEDRICH MAXIMILIAN VON (1762-1831), German poet and playwright, was born at Frankfurt-on-Main; was from 1780 to 1830 in Russian service, chiefly as head of the corps of pages. His drama, *Sturm und Drang* (1776) gave the name to the exuberantly-romantic school to which he belonged. He is best known by his novel, *Der Weltmann und der Dichter* (1798), and the plays *Conradin* and *Media*. See Riegen's *Klinger in der Sturm-und-Drang Periode*.

Klinger, MAX (1857), German painter and sculptor, born at Leipzig. In his etchings and paintings this romantic realist endeavours to unveil nature's hidden phenomena and the working of the human mind. His conceptions are original and bizarre, and his colouring unconventional. Among his etchings, *Eve of the Future* (1880), the series entitled *Life* (1882), and *Death* (1889) are remarkable. As a painter, his

most noted work is *The Judgment of Paris* (1888), now in the Vienna Gallery. His *Pietà* is in the Dresden Gallery, and his statue of *Salome* (1894) in the Leipzig Museum. See Meissner's *Life*, in German (2nd ed. 1899), and his *Klingerwerk* (1896-1901).

Klitsi, tn., Chernigov. gov., S.W. Russia, 100 m. N.N.E. of Chernigov; carries on cloth-making, wool-weaving, tanning, and leather work. Pop. (1897) 11,625.

Klip, riv., rises in N. Natal, British S. Africa, near Lady-smith, and flows s. past Colenso, and joins the Tugela R.

Klipspringer, a small but very active antelope (*Oreotragus saltator*), found in rocky regions from the Cape to Abyssinia. The height is under two feet, and the hoofs are said to be so small that all four could stand on a penny piece.



Klipspringer.

Klondike. See YUKON.

Klopstock, FRIEDRICH GOTTLIEB (1724-1803), German poet, was born at Quedlinburg. He was a pupil at Schulpforta (1739-45), and there conceived the idea of writing a great religious epic. The first three cantos of his *Messias* were published in 1748, and were welcomed as a great victory in the literary conflict with Gottsched. In 1751 Klopstock received a pension from Frederick v. of Denmark, and remained at Copenhagen till 1770, when he went to Hamburg, where he lived until his death. The twenty cantos of the *Messias* were not completed till 1773. Although Klopstock devoted so much labour to his epic, his gifts were essentially lyric. There is very little action (particularly in the second half), the central figure being stripped of all human elements and made the mere tool of Providence. The epic, however, contains many lyric passages of great beauty, and some which might even be called dramatic.

(5)

The whole has been aptly described as a 'psychological oratorio.' By his *Messias* and by his early *Odes* (collected in 1771) Klopstock did much to emancipate German literature from the French forms of verse, and to introduce Greek metres. He also wrote some patriotic dramas and other works, which do credit only to his intense love of the fatherland, and secure him unequalled popularity. His works have been edited by Boxberger (6 vols. 1879), by R. Hamel (4 vols. in Kürschner's *Deutsche National-Literatur*), and by Fr. Muncker (*Cotta'sche Bibliothek*). For his life, see Fr. Muncker's *Fr. G. Klopstock* (2nd ed. 1900), and E. Bailly's *Etude sur la Vie et les Œuvres de Fr. G. Klopstock* (1888).

Klosterneuburg, tn., Austria, prov. Lower Austria, on r. bk. of Danube, 5 m. by rail N.W. of Vienna. Its chief feature is the institution of the Augustine Canons (1106). There is also a Mechitarist (Armenian) college. Excellent wine is made. Pop. (1900) 11,595.

Kloster Zeven, CONVENTION OF, a shameful convention concluded on Sept. 8, 1757, by the Duke of Cumberland at the village of Zeven, 24 m. N.E. of Bremen, by which he agreed to disband his army, and thus leave Hanover to the French.

K.M., Knight of Malta.

Knapweed. See CENTAUREA.

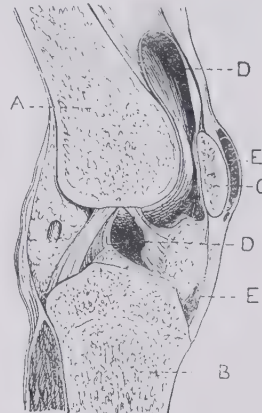
Knaresborough, mrkt. tn., W. Riding, Yorkshire, 18 m. W.N.W. of Leeds. There are ruins of a castle erected soon after the conquest, and captured by Fairfax (1647), and dismantled (1648). St. Robert's chapel, an artificial cave, was the cell of a 13th-century hermit. Another artificial cell, farther down the river, was the scene of the murder of Daniel Clarke by Eugene Aram (1745), an incident which forms the subject of Tom Hood's well-known poem. Near the town is a petri-fying dropping well. Manufactures include sheetings, towelings, rugs, and leather. Pop. (1901) 4,979.

Knatchbull-Hugessen, EDWARD HUGESSEN, BARON BRABOURNE (1829-93), English statesman, born at Mersham Hatch, Kent; assumed the name of Hugessen (1849); sat as Liberal M.P. for Sandwich (1857-80); a lord of the Treasury (1859-66); was under-secretary for the home department (1860 and 1866); and under-secretary for the colonies (1871-4). He wrote books for children, papers against Home Rule, and edited the letters of his grand-aunt, Jane Austen.

Knaus, LUDWIG (1829), German genre painter, born at Wiesbaden; was professor at the Berlin Academy from 1874 to

1884. Among his best-known pictures are *The Peasants' Dance* (1850); *The Gipsies' Camp* (1865), now at Königsberg; *The Children's Feast* (1869), in the National Gallery, Berlin; *The Holy Family in their Flight* (1876), at New York; *Behind the Stage* (1880), at Dresden; and many pictures of children—e.g. *The Village Prince*.

Knee. The knee is a hinge-joint or ginglymus, and the bones entering into its formation are the lower end of the femur, the upper end of the tibia, and the posterior surface of the patella, or knee-cap. The synovial membrane of the knee is the largest in the body. The chief movement at the knee is that of flexion and extension, but slight rotation is also possible. The chief affections to which the knee-joint is liable are sprain or rupture of ligaments, synovitis, fracture of



Section of the Knee.
A, Femur; B, tibia; C, patella; D, synovial sac; E, bursa.

the patella, displacement of semi-lunar cartilages, and tubercular disease. Dislocation of the knee is rare. As in other joints, rest plays a leading part in the treatment of disease or injury of the knee. The joint should be fixed by splints or by other mechanical contrivance; and should synovitis be present, counter-irritation and elastic pressure may also be employed. Elevation of the limb is generally desirable. In transverse fracture of the patella great difficulty is often experienced in securing sufficient relaxation of the extensor muscles to allow of bony union taking place between the fragments, and it is sometimes necessary to clamp or wire the upper fragment in apposition with the lower. Patients whose occupation compels them to kneel much are liable to an inflammation of the bursa over the patella.

The condition is often called 'housemaid's knee.' When the semilunar cartilages become movable, they produce the same symptoms as other loose bodies in a joint. 'Locking' of the knee in one position is a frequent symptom. Occasionally a knee-cap may be contrived which exercises sufficient pressure on the edge of the cartilage to keep it in place, but sometimes an operation is necessary either to fix or to remove the body.

Knecpling. This primitive Christian attitude in prayer (Acts 7:60; 20:36; 21:5) was intimately associated with the eucharistic controversy between the Puritan and Catholic parties in the Church of England. A declaration was inserted in the Prayer Book of 1552 explaining that the order requiring that the elements should be received by the communicants kneeling did not necessarily imply a real and essential presence of Christ in the sacrament. This declaration was somewhat altered in 1661-2, and the word 'corporal' was substituted for 'real and essential' presence. The declaration was in this manner made consistent with the doctrine of the real presence, while the teaching of the Anglican Church was clearly differentiated from that of the Church of Rome.

Kneller, SIR GODFREY (1646-1733), portrait painter, born at Lübeck in N. Germany; was a pupil of Rembrandt and Ferdinand Bol at Amsterdam. His real career began after he proceeded to London (1675) and was introduced (1678) to the court of Charles II. In this and in the following reigns he was pre-eminent in his profession, and painted most people of distinction in England and also several foreign sovereigns. For Mary II. he executed the *Beauties* at Hampton Court. His last public work was the portraits of the Kit-cat Club, and his most important an equestrian portrait of William III. at Hampton Court. He formed the first practical scheme for an institution to teach art (1711). His best work was treated with freedom and freshness, but his later tendency was towards the prevailing affectation of allegorical representation.

Kneller Hall, one of the finest specimens of Queen Anne architecture. It was the residence of Sir Godfrey Kneller, and is situated about midway between Twickenham and Hounslow, Middlesex. It now belongs to the nation, and the house is utilized as the headquarters of the Royal Military School of Music.

Kniaz Potemkine, first class battleship of the Russian navy Black Sea fleet, with a displace-

ment of 12,500 tons and a speed of 17½ knots. The ship has the unique distinction of being the first modern battleship which has mutinied against its government. This occurred in June and July 1905. In October 1905 the ship's name was changed to St. Panteleimon.

Knibb, WILLIAM (1803-45), English Baptist missionary, born at Kettering; was teacher in a school in Jamaica (1824). Returning to England (1832), he greatly promoted the Emancipation Act of 1833. He died in Jamaica.

Knickerbocker Families, a name for the Dutch settlers of New York and their descendants. It originated in the *nom de plume* of Diedrich Knickerbocker, used by Washington Irving in his *History of New York* (1809).

Knight, CHARLES (1791-1873), English author and publisher, was born at Windsor, where in 1812 he established the *Windsor and Eton Express*, editing it till 1821, and simultaneously printing the *Etonian*. From 1820 to 1822 he conducted, in conjunction with E. H. Locker, *The Plain Englishman*. Settling in London (1822), he founded *Knight's Quarterly Magazine*, thus beginning a striking record as editor and publisher of standard and valuable works at uncommonly low prices. For the Society for the Diffusion of Useful Knowledge he issued the *Penny Magazine* (1832-45), the *Penny Cyclopædia* (1833-44), and the *English Cyclopædia* (1853-61). His *Pictorial Shakespeare* (1838-41) introduced the dramatist to new circles of readers. He appropriately accompanied this work with his popular if somewhat uncritical *Shakespeare: a Biography* (1843). Knight's other publications—prepared in the same spirit, and well received—include *The Library of Entertaining Knowledge* (1829, etc.); *The Pictorial Bible* (1836); *The Pictorial Prayer-Book*; *The Pictorial History of England* (1837-44); *London Pictorially Illustrated* (1841-4); *Old England Illustrated* (1844); *Once Upon a Time* (1854); and *Popular History of England* (1856-62). He was appointed publisher of the *London Gazette* (1860). See Knight's *Passages of a Working Life* (1864-65), and *Life* by Alice Clowes (1892).

Knight, EDWARD FREDERICK (1832), war correspondent, journalist, and author, born in Cumberland, was educated at Westminster and Cambridge. He was called to the bar in 1879, and since that time has had an active life as *Times* war correspondent in the Hunza-Nagyr campaign (1891), Matabeleland (1893-5), Madagascar (1895), Sudan (1896,

and 1897-8), Greece (1897), Spain (1899), and was the *Morning Post* special war correspondent in the South African war (1899-1902), when he lost his right arm at Belmont. Mr. Knight is also an expert sailor, and has published *Albania* (1880), *The Cruise of the 'Falcon'* (4th ed. 1887), *The 'Falcon' on the Baltic* (1889), *The Cruise of the 'Alerte'* (1890), *Where Three Empires Meet* (3rd ed. 1893), *Rhodesia of To-day* (1895), *Madagascar in War Time* (1896), *Letters from the Sudan* (1897), *A Desperate Voyage* (1898), *With the Royal Tour* (1902), and *South Africa after the War* (1903).

Knight, RICHARD PAYNE (1750-1824), English archaeologist and numismatist, and classical scholar, who bequeathed his collection of coins, medals, pictures, prints, and drawings, valued at £50,000, to the British Museum. He wrote *An Account of the Remains of the Worship of Priapus* (1786), *An Analytical Enquiry into the Principles of Taste* (4th ed. 1808), *Carmina Homérica* (1808), a poem entitled *Landscape* (1794), and *The Progress of Civil Society* (1796). He sat in Parliament as M.P. for Leominster (1780), and for Ludlow (1784-1806).

Knight, WILLIAM ANGUS (1836), professor of moral philosophy at St. Andrews University (1876-1902); was the hero of the famous 'Knight heresy case.' His writings include volumes on Hume (1886) and Wordsworth (1889), whose *Works* he edited (12 vols. 1896-7). He is editor also of *Philosophical Classics for English Readers* (15 vols. 1880-90), *Translations of the Wordsworth Society* (8 vols. 1880-6), and twenty-five volumes of the University Extension Manuals (1891, etc.); and has written *Principal Shatrp and his Friends* (1888), *The Philosophy of the Beautiful* (1891-3), *Nugæ Viatoris* (1897-1903), *Andrapolis* (1903), and other books, *Retrospects* (1904; 2nd series, 1905).

Knighthood. In the *Germania* Tacitus asserts that among the German tribes the *principes*, or official magistrates, were attended by a body of *comites*, or companions, who fought for their masters in time of war. These *comites*, after the English conquest of Britain, were known as *gesiths*. After the first series of Danish invasions (855-897), the *gesiths* were mostly merged in the new class of thegns, some of whom no doubt received land in exchange for military service. Stubbs says that after the time of Athelstan 'the *gesith* is lost sight of, except very occasionally, the more important class having become thegns, and the lesser sort sinking into the rank of mere servants of the king.' The thegn class, which had some of the character-

istics of the later knight class, increased in importance, and by the time of the Norman conquest had become the great landowning body in England.

After 1066 the term knight was extended to the whole body of military tenants, and gradually it became recognized that every man who had twenty pounds' worth of land was liable to knighthood. While military service existed to some extent in Anglo-Saxon times, it became under the Normans the necessary feature of knighthood. Every knight, though he might hold his land of some *mesne* lord, owed military service to the king. (See CHIVALRY and FEUDALISM.) The Oath of Salisbury in 1086 emphasized this obligation. Closely connected with knighthood is chivalry, which may be said to represent the atmosphere which surrounded the mediæval knight. The religious character of the investment of a knight, the respect paid to women, the development of the idea of honour, all formed part of that chivalry which was closely bound up with the order of knighthood. The knight's fee was subject to certain feudal rights, incidents, and services, and both in England and on the Continent there were various grades of knighthood. The feudal system of tenures was valuable for defensive purposes; but Henry II. found that the restriction of the service of holders of fiefs to forty days made offensive warfare impossible. He therefore levied scutage instead of demanding the personal attendance of knights for foreign service, and thus was able to hire mercenaries. In the Hundred Years' war Edward III. relied mainly on the system of enlistment by means of a contract between himself and certain great nobles. Though Edward III. and his court made great efforts to revive chivalry and knighthood, the discovery of gunpowder and the development of commerce gradually destroyed its military character. After the rebellion of Wat Tyler, Philip Walworth, the intrepid mayor of London, was knighted—an honour never before received by a civilian. In the Tudor period civilians frequently received the honour of knighthood, and in more modern times men who have distinguished themselves in almost any civil calling are knighted. The decay of knighthood as a purely military institution was rapid from the end of the 14th century. Men who held a certain amount of land were still liable to be called upon to take up the dignity of a knight; and Charles I., when in need of money, fined many of his subjects for their non-compliance

with the letter of the law. At the restoration knight-service was formally and finally abolished. Lord Tennyson, by his poems upon King Arthur's Round Table, has in our own day thrown a halo of romance round the knights who were associated with the king in warfare or in the search for the Holy Grail. There is no doubt that the system of knighthood, owing to its close connection with religion, proved a valuable civilizing force in the middle ages, when feudalism was rampant, and the position of European monarchs by no means firmly established. See Stubbs's *Constitutional History of England* (1865); Grose's *Military Antiquities* (1786-8); Freeman's *Norman Conquest* (3rd ed. 1877); Selden's *Titles of Honour* (1614); Nicolas's *British Orders of Knighthood* (1841-2); Gautier's *La Chevalerie* (1891).

Knighthia, a genus of trees and shrubs belonging to the order Proteaceæ. The New Zealand species, *K. excelsa*, is the only one cultivated in Britain. It has long, thick, evergreen, coarsely-toothed leaves, and bears long axillary racemes of pinkish flowers. It is easily grown in the greenhouse, in a light, well-drained, peaty soil.

Knighton, WILLIAM (d. 1900), vice-president of the International Literary and Artistic Association of Paris; became successively headmaster of the Normal College at Colombo, and professor of history and logic at the Hindu College, Calcutta. He is author of a *History of Ceylon* (1845), *Forest Life in Ceylon* (1854), *The Private Life of an Eastern King* (1856), and *Struggles for Life* (1886).

Knight-service, the tenure by which in feudal days a tenant-in-chief held his property of the king—i.e. for each knight's fee he had to provide one fully-armed knight. He was also liable to the feudal aids, which were abolished in 1660.

Knights Hospitallers. See HOSPITALLERS.

Knights of Labour. See TRADE UNIONS.

Knights of Rhodes and Malta. See HOSPITALLERS.

Knights of St. John of Jerusalem. See HOSPITALLERS.

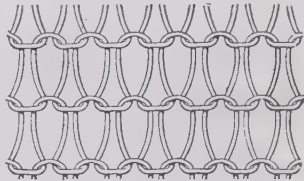
Knights Templars. See TEMPLARS.

Knitting, the forming of a looped web or fabric, may be done (1) by hand; (2) on a frame.

(1.) Hand knitting has for appliances two or more straight needles of wood or iron, the fabric being, by the aid of these, made up from one continuous thread. A series of loops is formed successively on each needle by passing the thread

round a pin and drawing it through the previously-made loop. Each stitch so worked is then slipped off and left hanging free. The first row being completed, a second row is worked below it in a similar manner; and so on to any length. If two needles only are used, the fabric formed will have a selvage or edge on each side; if three needles, a continuous circular web, as of a stocking, may be knitted. Variation in width to any extent may be obtained by increasing or decreasing the number of stitches in a row; and alterations in design may be effected by looping the thread in different ways or by the introduction of threads of various colours.

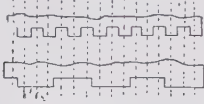
(2.) Framework knitting was introduced about the year 1589 by William Lee of Nottinghamshire, the mechanical principles of whose invention remain almost unaltered to the present day. By providing, in the 'hand-stocking frame,' a needle for each loop, so that all the loops in one row were formed simul-



Arrangement of loops in ordinary web made on hand frame.

taneously, the speed of knitting was increased from 100 stitches per minute by hand to 600 stitches per minute on the frame. The first fabric thus produced was a flat piece, circular work not being accomplished until later. The frame was of a coarse gauge—having only sixteen needles in three inches—and necessitated the thread being laid over the needles by hand. Between each needle was a 'jack sinker,' which fell down to form the loop, and was then raised so as to leave the loop free on the needle. The loops were next secured by a series of springs, or 'beards,' closed by a horizontal bar called a 'presser,' and the last (finished) row of loops being brought over the needle beards, dropped upon, and completed the formation of, the next row. About 1620 many improvements were made by Ashton. The needles were placed much closer together, and a second set of sinkers, termed 'lead sinkers,' was added, and placed alternately with the jack sinkers. In later machines of the same class one jack sinker, making a loop over three needles, was

worked alternately with two lead sinkers, a very fine fabric



Forms of Tuck Pressers.

being produced. Frames are now at work with as many as forty-

presser was added in the year 1745. This had its edge cut instead of plain, and so could press any one needle beard, or leave one open, and thus allow the old and new loops to remain together on the needles for one or more rows. In this way were introduced fancy designs, which were further developed by the use of different-coloured yarns at different courses.

Rib work was the first variation

the back, a ribbed and much more elastic fabric was produced. Another method of making rib work is to have a second set of needles working at right angles to the ordinary frame needles, and forming a series of loops depending from the sinker loops of an ordinary plain course. The method of producing those open-work designs, from which the modern lace hosiery has developed, was introduced about 1763. Certain loops are removed from one needle and added to an adjoining one, the empty needle forming a small hole in the fabric.

Warp Knitting.—The first great variation in framework knitting was made by the adoption of 'warp' threads, one to each needle, instead of the one thread to each row, as in the former (plain-knitting) methods. The warp threads are laid alternately on the needles to right and left, thus forming a series of loops without the intervention of sinkers, which are dispensed with altogether. This system was perfected by the invention of the Dawson wheel, which enabled the threads to be laid in any direction at any course.

Mechanical Frames.—The first stocking-frame was driven by steam power in 1828, and from that date the hand stocking-frame and hand warp-frame were gradually superseded by the rotary frames and looms, the machines of to-day. Hand-frames are now only in use for exceptional work, as in the glove and fancy shawl trades, where great manipulation of the threads and variation of the loops are required.

Circular Knitting.—About 1830 a French inventor introduced a machine for circular knitting by means of a series of bearded needles radiating outwards from a revolving ring, the loops being formed by sinkers which also revolved. Ten years later a machine was introduced in Nottingham which performed similar work, but of smaller diameter, by means of vertical needles and bladed sinker wheels. A machine on this principle is still known as the English loop-wheel circular frame. A still greater improvement was the adoption, in 1848, of a self-acting or 'latch' needle, which formed a loop without the aid of the sinkers and pressers indispensable to the bearded needle. The latch needle has a hook which is closed automatically by a latch at one part of the stroke, so that the new loop may be passed through the old one, and is then opened for the former loop to be freed and another admitted. This machine produced circular fabrics much

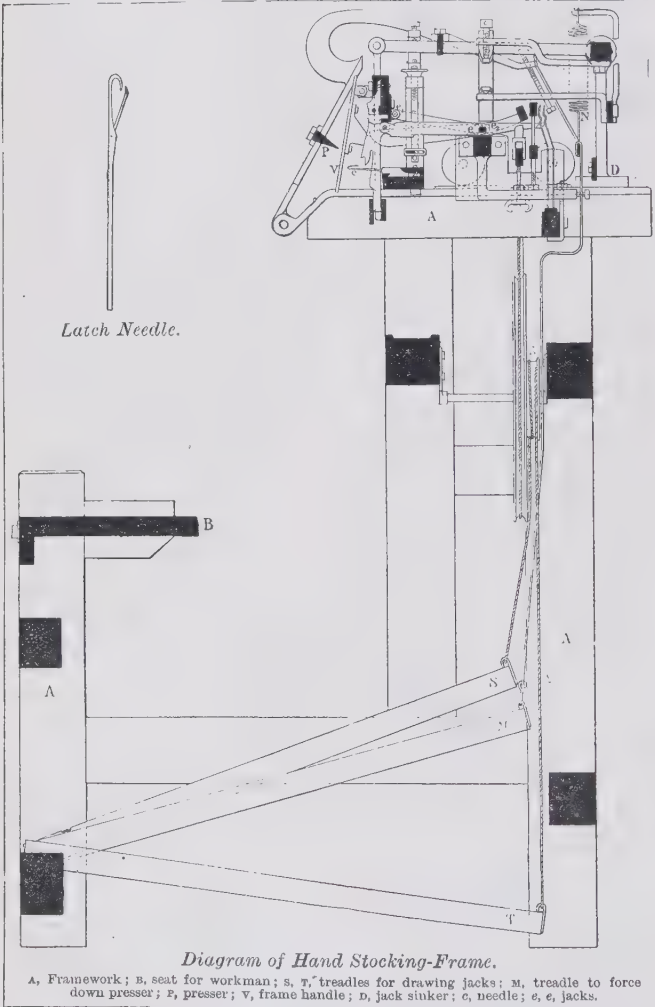


Diagram of Hand Stocking-Frame.

A, Framework; B, seat for workman; S, T, treadles for drawing jacks; M, treadle to force down presser; P, presser; V, frame handle; D, jack sinker; C, needle; E, jacks.

five needles to the inch. Thread carriers were also introduced, to enable the thread to be laid mechanically at the same time as the loops were being formed.

In order to vary the stitch produced on the hand frame, a 'tuck'

from a plain fabric, and was produced on a hand frame by the addition of a rib machine invented by Strutt about 1758. By forming certain loops (as in plain work) to the front of the web, and others (termed rib loops) to

more cheaply than could any other type; but for some years the latch-needle system was not adapted for making flat fabrics. For these, the older bearded needle frames—improved by the patents of Paget in 1857 and Cotton in 1864—were still used. About 1870 an American automatic machine, called the Griswold knitter, was introduced into England. This was of the latch-needle type, but differed from the older English latch-needle circular frame in having the needles stationary, and in being worked by revolving cams. When put out of reach of the cams, as is possible at will, the needles are idle; knitting movements take place only when the needles are in the working position. Either flat or circular fabrics can be made on this machine, which has been improved, by successive inventions, so as to produce also either plain or ribbed material. No circular 'shaped' fabrics have as yet, however, been made automatically.

Knives, TABLE. The best kinds of table knives are forged by hand out of a flat bar of crucible steel; but mechanical forging is now extensively employed in Sheffield. Hand-forging is scarcely ever seen in the cutlery works of Germany and the United States. The hand forger first hammers the end of the bar into a roughly-shaped blade, and upon it welds a piece of iron from which he produces the 'bolster' (the raised portion between the blade and the handle) and the 'tang,' on which the handle will afterwards be fastened. The complete blade is then heated again, and hammered in such a way as to make an edge. The next operation, known as hardening and tempering, is the most difficult and important of all the processes, as the cutting and wearing qualities of the knife depend largely upon the manner in which it is performed. Hardening is accomplished by heating the blade to a full cherry-red colour and suddenly plunging it into cold water. The steel is then almost as brittle as glass, and needs to be tempered or let down to one of several degrees of hardness. It is put into the fire again, where it first becomes straw colour, and successively mottled brown and purple, dark blue, and light blue. Each colour represents a different degree of hardness, the last being the softest stage. Machine-forging is done by a power hammer delivering a series of rapid blows, or by stamping out the blade from a strip of steel by a single blow in a machine. A cheaper grade of steel is employed for machine-forged knives, and the blade, bolster, and tang are made in a

single piece. Hand-forged knives can be recognized by a sort of thumb-mark at the bottom of the blade caused by the welding of the blade to the bolster and tang.

From the forger the blade goes to the grinder. After a preliminary rough grinding on back and edge, and next on each side, it undergoes a series of polishing processes, the first being known as glazing, which is done on a wooden wheel. Then follows 'buffing' on a wheel covered with thick bull's-neck or sea-horse leather treated with glue and fine emery, the effect being to produce an equally smooth finish all over.

The finest hafting material is ivory, which comes to Sheffield in complete elephants' tusks, and is sawn up into the different sizes of handles. The material most used for this purpose, however, is an imitation of ivory known as celluloid or xylonite, composed of cotton waste and camphor. Other hafting materials are stag's, buffalo's, and cow's horn; in some foreign countries wood is preferred. For hotel use table knives are fitted with handles made of German silver, fashioned hollow and plated.

PEN AND POCKET.—The invention of spring knives, the blades of which could be folded into the handle, about the middle of the 18th century, was an important event in the cutlery industry. The penknife is so named because it was originally made to cut the nibs in quill pens. Many kinds of hafting material are used for these knives, the most popular ones being silver, German silver, ivory, pearl, tortoise-shell, celluloid, steel, horn, and wood. 'Article' knives comprise, in addition to blades, various instruments, such as corkscrews, hooks, leather borers, cigar cutters, small rules, can-openers, wire-cutters, and smoker's requisites.

Knobel, KARL AUGUST (1807–63), German Biblical scholar and Orientalist, was born at Tzschscheln, near Sorau, Silesia, and was professor successively at Breslau (1835) and Giessen (1838), where he died. His critical faculty was well developed, and his erudition in the realm of Eastern archaeology was remarkable. His commentary on Genesis forms the basis of Dillmann's work (trans. by Stevenson), and he occupies an important place in the development of Pentateuchal criticism. Other works by Knobel are *Der Prophetismus der Hebräer* (1837), and commentaries on Ecclesiastes (1836), Isaiah (1843), Exodus and Leviticus (1857), Numbers, Deuteronomy, and Joshua (1861).

Knock. (1.) Parish, Co. Mayo, Ireland, 5 m. N.N.E. of Clare-

morris. In 1879 it was reported that the Blessed Virgin had visited the church, and as a result it became for some time a pilgrimage resort. (2.) Or EYE, or UIE, eccles. par., Lewis, Outer Hebrides, Scotland. Pop. (1901) 3,948.

Knock-knee is a deformity in which the legs, instead of being parallel when extended with the feet pointing forwards, diverge so that when the knees touch each other the internal malleoli of the ankles are some distance apart. Curvature of the spine and other skeletal deformities of similar type are frequently associated with knock-knee. The condition arises as a result of rickets in children between the ages of two and seven; also in growing lads, less frequently girls, about the age of puberty. In slight cases, where the child is young and the bone still soft, the condition may be cured by keeping the patient's feet entirely off the ground and by applying splints, which straighten the legs, dietetic and hygienic measures being also adopted to counteract rachitic tendencies. In patients who are older, or in whom the deformity is more marked, osteotomy of the femur is generally necessary, and the limb kept in a straight position by means of splints or plaster bandages for about six weeks.

Knossus, Crete. See CNOSSUS. Further excavations of the ruins (1905) have revealed what was undoubtedly a royal palace of Minos' race, highly ornamented architecturally and decoratively.

Knot (*Tringa canutus*), a bird belonging to the same genus as the sandpipers, which winters in Britain in considerable numbers. It is found practically over the whole world, but breeds only in the far north—probably in N. Greenland and Arctic America. In the non-nuptial plumage the bird is ash-gray above and white flecked with gray below; but when breeding the under surface is largely chestnut, and the back red-brown with black-and-white markings. Birds which winter in Britain display in spring less brilliant colouring than those which winter farther south.

Knot, the conventional nautical mile, is assumed to be 6,080 ft. A statute mile is 5,280 ft. For navigating purposes, a mile of latitude and a minute of latitude are considered to be of equal value. Consequently the nautical mile is the length of a minute of the meridian, and, strictly speaking, is different for every latitude. In the United States the sea mile is calculated at 6,082'66 ft. For charting and other purposes 10 cables make one knot, though a cable, as

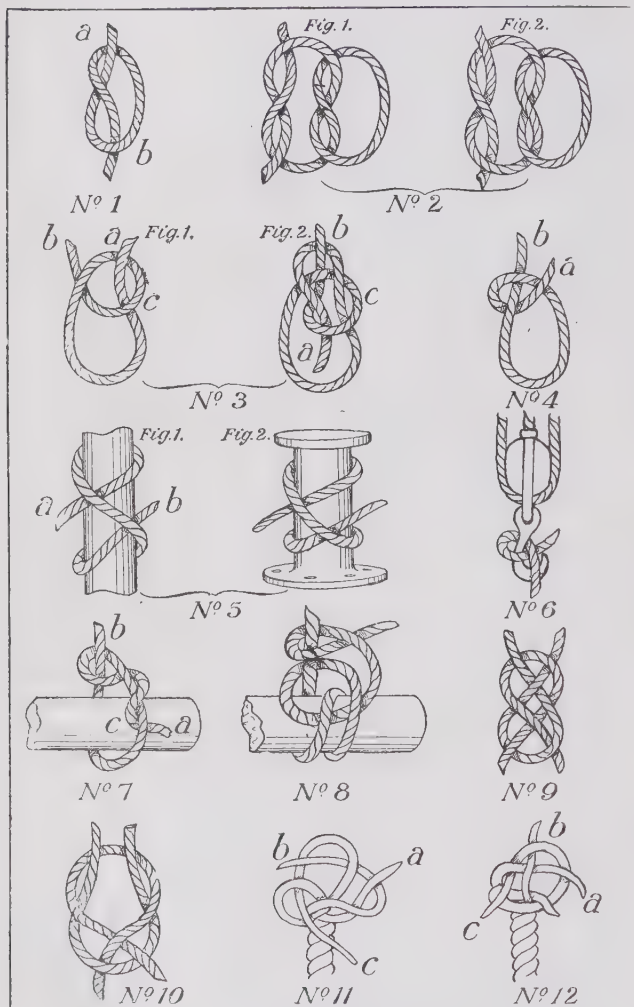
a measure of distance, is generally assumed to be 600 ft. A knot is so called from the fact of knots being made in the log-line, which is used to ascertain the rate at which a ship is progressing through the water. See LOG, NAVIGATION.

piece of rope, made with or without inlaying the strands of it, or (b) a method of arranging a rope for making it fast to another, or to some object, such as a ring or a spar. Among the usual knots are the following:—

(1.) 'Overhand knot.' The

(3.) 'Bowline knot.' Lay the end of the rope *a* over *b* so as to form a bight *c*; pass the end *a* round behind and under *b*, and through the bight; continue with *a* to pass it under the standing part *b*, and through the bight *c* in the opposite direction. This knot forms the best loop that will not slip (No. 3). (4.) 'Half-hitch.' Pass the end *a* of the rope round the standing part *b*, and through the bight (No. 4). (5.) 'Clove hitch.' Pass the end *a* round a spar, and cross it over *b*. Pass it round the spar again, and put it through the second bight (No. 5, Fig. 1). This is a knot that is very useful and safe. For making a line fast to a bollard, the whole process can be quickly done by an expert by merely throwing two loops, placed rightly, over the top of the bollard, and pulling taut (Fig. 2). (6.) 'Blackwall hitch.' Form a bight at the end of a rope, and put the hook of a tackle through the bight, so that the end of the rope may be jammed between the standing part and the back of the hook (No. 6). (7.) 'Timber hitch.' Take the end *a* of a rope round a spar, then round the standing part *b*, then several times round its own part *c* (No. 7). (8.) 'Fisherman's bend.' Take two turns round a spar, then a half-hitch round the standing part, and between the spar and the turns, and lastly, make a half-hitch round the standing part (No. 8). (9.) 'Carrick bend.' Lay the end of one rope over its own standing part so as to form a bight. Put the end of the other rope through this bight under the standing part, over the end beyond the bight, under the standing part beyond the bight, and down through the bight over its own standing part (No. 9). (10.) 'Sheet bend.' Pass the end of one rope through the bight of another, round both parts of the other, and under its own standing part. (11.) 'Single wall knot.' Unlay the end of a rope, and with the strand *a* form a bight. Take the next strand *b* round the end of *a*. Take the last strand *c* round the end of *b*, and through the bight made by *a*. Haul the ends taut. This knot is for the purpose of forming a stopper, and to prevent the end of a rope from coming apart. (12.) 'Single wall crown.' To make a crown on a single wall knot, take one of the ends, *a*, and lay it over the knot; lay *b* over *a*, and *c* over *b*, and through the bight of *a*. Pull the ends taut.

In addition to the single wall knot there are a double wall and a double wall crown knot, made in a similar way by doubling the strands. For the double wall crown knot, form a single wall



Common Knots.
(For explanation, see text.)

Knot (in cordage). Scientifically defined, a knot is an endless physical line which cannot be deformed into a circle. The scientific knot has been extensively treated in works by Listing (*Göttinger Studien*, 1847) and by Tait (*Trans. Roy. Soc. Edin.*, 1876-7). For practical purposes a knot is either (a) a knob at the end of a

commonest kind of knot, made by passing one end of a line over the line and round it, and then passing it through the loop. (2.) 'Reef knot.' Form an overhand knot as above, and repeat the process with the opposite end of the line (Fig. 1): if two overhand knots are made the same way, the result will be a 'granny' (Fig. 2).

crown, then let the ends follow their own parts round until all the parts appear double. Put the ends down through the knot. Several other knots are used in seamanship.

Knot, a thong of leather, triangular in shape, and very long, with which people were flogged upon the back in Russia. It was sanctioned by the father of Peter the Great, and was abolished by Czar Nicholas I. Usually the victim did not survive the thirtieth blow, but a skilful executioner could kill him with one stroke. The punishment seems to have been introduced by the Tartars.

Knowles, SIR JAMES (1831), English editor, and founder of the *Nineteenth Century*; was an architect, and designed Tennyson's house (Aldworth, on Blackdown, in Surrey), Kensington House, the Thatched House Club (St. James Street), Albert Mansions (Victoria Street), and churches at Clapham. In 1869, with Tennyson's help, he founded the Metaphysical Society, whose members included many of the leading men of the day. The society came to an end after ten years. It was with the support of many of its members that Knowles successfully conducted the *Contemporary Review* (1870-77), and they followed him when, in 1877, he left it to found the *Nineteenth Century* (now the *Nineteenth Century and After*).

Knowles, JAMES SHERIDAN (1784-1862), British dramatist, born at Cork, his father being first cousin of Richard Brinsley Sheridan. The son became acquainted with Hazlitt and Charles Lamb, and made an appearance on the stage. For many years, however, he taught at Belfast and at Glasgow. *Caius Gracchus*, his first great success (produced at Belfast, 1815), was followed by other plays, such as *Virginius* (1820), *The Hunchback* (1832), *The Love Chase* (1837). His dramas are of genuine merit, but as an actor he was less fortunate. In later life he became a Baptist, and lectured on 'No Popery' at Exeter Hall, London. See *Life of James Sheridan Knowles*, by his son (1872).

Knowltonia, a genus of perennial herbaceous South African plants belonging to the order Ranunculaceae. They bear branching cymes or umbels of dullish flowers, and secrete peculiarly acrid juice. *K. vesicatoria* is occasionally seen as a greenhouse plant, thriving in a soil containing one-fourth peat.

Know-nothings, a party first organized in the United States in 1853, being originally a secret association, whose members, refusing to give information about themselves, were called 'Know-

nothings.' Their object was to secure the government to those whom they considered genuine Americans. Catholics and recent emigrants they regarded with suspicion. For a moment powerful, especially in the Northern States, they were able to put up Millard Fillmore as presidential candidate in 1856; but the agitation on the slave question swept them out of existence. They are sometimes known as 'the American party.'

Knowsley, par., Lancashire, England, 5 m. w. of St. Helens. Near it is Knowsley Hall, the seat of the Stanleys since the reign of Richard II. It stands in a park of 2,000 acres, and contains valuable art treasures by Rembrandt, Rubens, Tenier, and Correggio, and an extensive library.

Knox, JOHN (1513-72), Scottish reformer, was the son of William Knox, a feudal dependant of the earls of Bothwell, and his mother's name was Sinclair. He was born either in Giffordgate, Haddington, or at Morham (of which the earls of Bothwell were lords), in the adjoining district of Gifford. Formerly he was supposed to have been born in 1505, but later opinion favours 1513. If this date be accepted, he could not have been the John Knox who, on Oct. 25, 1522, entered the University of Glasgow, where the famous John Major, a native of Haddington, was then professor. At some unknown date he took minor orders, and during 1540-3 he is known to have been practising as a notary in the Haddington district. While in 1546, acting as tutor to the sons of Douglas of Longniddry and Cockburn of Ormiston, he came under the influence of the reformer Wishart, and it was he who, the day before Wishart was arrested, bore the two-handed sword which it was customary to carry before him as a guard. Having rendered himself thus conspicuous, he, in his turn, became marked as a victim; and to escape arrest, he took refuge in April 1547 with his pupils in the castle of St. Andrews, then held by the murderers of Cardinal Beaton. There, at the urgent request of certain leading reformers, he was induced, after great hesitation, to take upon him the vocation of preacher in the parish church of St. Andrews, which he did, as was at once remarked, with greater effect than even Wishart. His labours were, however, cut short by the surrender of the castle to the French in July, when he and other reformers, in violation of the terms, were sentenced to labour in the French galleys. Having, however, obtained release in February

1549, he went to London, where he so commended himself to the king and council that he was sent to preach at Berwick-on-Tweed. Thence early in 1551 he was transferred to Newcastle-on-Tyne. While there he seems to have been appointed a royal chaplain; at any rate, he was in 1552 invited to preach before the court in London, and his sermon had considerable effect in modifying the rubric on kneeling at communion. After declining the bishopric of Rochester and the living of All Hallows, London, he was sent in June 1553 on a preaching tour in Buckinghamshire. On the accession of Mary Tudor he, however, returned to the north, and finally, in January 1554, set sail for Dieppe. While there he sent to England a printed 'Godly Letter to the Faithful in London, Newcastle, and Berwick.' From Dieppe he proceeded to Geneva, where he met Calvin, and afterwards to Zurich, to consult Bullinger as to the attitude of Protestant subjects to Catholic sovereigns. That, however, the cautious views of Bullinger did not impress him is evident from the pamphlet entitled *Faithful Admonition unto the Professors of God's Truth in England*, which appeared shortly afterwards. After returning to Geneva he accepted, in the autumn, a call from the English refugees at Frankfort-on-the-Main; but on account of the intrigues of objectors to his extreme views, he was compelled to leave the town. Finding himself again in Geneva, he there took part in organizing an English congregation; but having in the autumn of 1555 gone to visit his wife and his mother-in-law at Berwick-on-Tweed, he there received such favourable news of the progress of Protestantism in Scotland that he resolved to journey to Edinburgh. His visit was specially opportune, for the Catholic policy of the queen-regent had become so identified with the ambitious aims of France, that many of the leading nobles and barons were, even on grounds of patriotism, becoming more and more favourably disposed towards Protestantism. As may be supposed, Knox made the most of this turn of good fortune, and before the alarm caused by his success compelled him in July 1556 again to leave Scotland, he had practically given to Protestantism an impetus that almost ensured its final triumph, many of the nobles and barons of the highest character and ability having been induced to cast in their lot with the cause he championed. Returning to Geneva, he, with the exception of a few months at Dieppe in 1557,

remained there as joint-pastor with Goodman of the English congregation until his final return to Scotland in January 1559. Though deeming it imprudent until then to return to Scotland, he endeavoured to exercise a dominant influence over the reformers, both there and in England, by a series of hortatory letters and pamphlets, including the famous *First Blast of the Trumpet against the Monstrous Regiment of Women*, which proved such a serious embarrassment to

thusiasm, but inaugurated a policy of more thorough-going reform, marked by the wholesale destruction of the so-called 'monuments of idolatry.' When, at the most desperate crisis of the struggle, everything seemed going against the reformers, he never lost hope that God 'would give His children the victory in the end,' and it was his confidence mainly that nerved them to resistance until—owing to Maitland's diplomacy—Elizabeth was induced to send them such aid in

'devout imagination' of Knox, the *First Book of Discipline*, the predominance of Calvinism in church and state was only partially realized; and Knox, although possessing almost full liberty to fulminate against both the private and public conduct of the queen, remained for some years the impotent spectator of a temporizing policy which filled him with the deepest alarm. His distrust of the Protestant leaders Moray and Maitland was increased after each of the famous interviews with the queen which he has so graphically described; for he clearly discerned that she at least would never own spiritual allegiance to him, and that even should she be enticed to break with Catholicism, the Protestantism she would sanction would not consort with his Calvinistic ideals. The victory, however, was to remain with Knox, though less on account of his guidance than of the queen's bad luck. The Darnley marriage was the first step towards both her ruin and the hopeless overthrow of Roman Catholicism. Had Darnley been other than he was, it might not have been so; but from this time the fortunes of the queen, however they might appear to fluctuate, went steadily from bad to worse. Her association with Rizzio was the second step downwards. Whether Knox had full knowledge of the Rizzio conspiracy or not, he fully approved of the murder; and after the escape of the queen to Dunbar he deemed it prudent to 'pass west to Kyle.' In December following he also obtained leave from the assembly to go on a special mission to England; but after the murder of Darnley he returned, and did his utmost to rouse the nation against the queen and Bothwell. Henceforth he and Moray acted in concert, and although neither Lennox nor Mar, Moray's successors, shared his full confidence, the success of Protestantism was fully assured. Knox's work was now practically done; his physical strength had been for some time on the wane before the occurrence of a mild stroke of apoplexy, in October 1570, warned him that his strenuous labours were drawing to a close. But though his bodily weakness steadily increased, his zeal in no wise abated. On account of his denunciations of Kirkcaldy, who held the castle of Edinburgh for the queen, he was compelled to remove from Edinburgh; but at St. Andrews, as we learn from James Melville's *Diary*, he continued to manifest all his old oratorical energy; and although finding it necessary on 'his first entry to lean on the pulpit' for



John Knox—the Portrait by Hondius, rejected by Carlyle, but now generally accepted as genuine.

him after the accession of Elizabeth. During his residence at Geneva he came more entirely under the influence of Calvin—a fact which had permanent effect in shaping the character of Scottish Protestantism, as regards both doctrine and church government, although Knox was by no means hostile to the order of bishops. On his arrival in Scotland he found the reformers in active resistance to the queen-regent, and by his remarkable sermons he not only greatly strengthened the Protestant en-

men and money as to force the queen-regent to an agreement freeing Scotland from the French soldiers. The victory now remaining with the reformers, Knox, under the new régime, became minister of Edinburgh (1560). The death of the queen-regent was a further blow to Roman Catholicism, and before the arrival of Mary Stuart in Scotland in 1561, Protestantism was formally installed as the established religion of the country. Still, by the reluctance of the politicians to accept of that

support, before 'he had done with his sermon he was so active and vigorous that he was like to ding that pulpit in blads [knock it into shivers], and flee out of it.' In August 1572 he returned to Edinburgh, where, after being carried to the pulpit, he continued to address smaller audiences in a portion of St. Giles, then known as the Tolbooth—the occurrence of the massacre of Bartholomew, in September, supplying an admirable theme for his denunciatory eloquence. But even his bright and powerful spirit could not long contend with such physical ailments as now beset him. With the effort to preside at the admission of his colleague Lawson to St. Giles, on November 9, he had exhausted his remaining strength, and he returned home only to wait for death, by which he was released on the 24th. On the 26th he was buried in the churchyard of St. Giles, now forming part of the courtyard of Parliament House, where a plate on a flagstone with the initials I. K. marks his grave.

Neither the character nor the work of Knox can be properly judged by present-day standards. Essentially the product of an extraordinary crisis in social and religious history, his personality and opinions were moulded by circumstances the nature of which we can now but imperfectly realize. Though less narrow and bigoted than his immediate ecclesiastical successors, his religious views were necessarily coloured by the mental thralldom of the preceding centuries, and like that of his opponents, his conduct was characterized by an ecclesiastical arrogance which the majority of the nation would now resent. That he neither 'feared nor flattered any flesh' says much for his courage and his honesty; but his attitude towards secular dignitaries was largely traceable to a mistaken conviction of personal infallibility. He was thus great mainly as iconoclast, and his iconoclastic zeal was too indiscriminate. As a theologian he cannot lay claim to any special eminence, being content to be regarded as the humble disciple of Calvin. As a social reformer he was perhaps unequalled, so far as the mere imposition of disciplinary restraints is concerned; but it was here that—notwithstanding his enlightened views in regard to education—the defects of his qualities were specially manifest, for he left out of account all that related to art and much that related to enjoyment. For the work he undertook, his most remarkable endowment was that of eloquence—eloquence springing from overmastering conviction.

His appeals and denunciations, inspired by a rare combination of religious fervour, sarcastic humour, and practical insight, were an important cause of the marvellous rapidity of the Protestant triumph. The best mirror, both of himself and of the Protestant aspect of his time, is that supplied by his own *History of the Reformation in Scotland* (1584), the human interest of which bids fair to survive long after the ecclesiastical disputes it 'embalms have become obsolete.

The standard edition of the *Works of Knox* is that in 6 vols., ed. by David Laing, for the Wodrow Society (1846-8). See also M'Crie's *Life of Knox* (new ed. 1905); P. Hume Brown's *John Knox* (2 vols. 1895); Macmillan's *John Knox, a Biography* (1905); Lang's *John Knox and the Reformation* (1905); Glassey's *John Knox* (1905); Cowan's *John Knox* (1905); and a new ed. of *Knox's Hist. of the Reformation*, by C. J. Guthrie, K.C. (1905).

Knoxville, city, Tennessee, U.S.A., co. seat of Knox co., and one of the most important cities of the state, 165 m. E. of Nashville. Here the beautiful Tennessee marble is quarried, and there are iron mines. The principal industry is iron-manufacturing. It is the seat of the University of Tennessee. Pop. (1900) 32,637.

Knur and Spell. See TRAP AND BALL.

Knutsford, urban dist., par. and mrkt. tn., Cheshire, England, 6½ m. E.N.E. of Northwich, is a favourite residence for Manchester merchants. The town and its inhabitants have been depicted in *Cranford* by Mrs. Gaskell. Several old-world customs survive, and May Day festivities are still celebrated. Pop. (1901) 5,172.

Knutsford, HENRY THURSTAN HOLLAND, VISCOUNT (1825), English politician, was called to the bar in 1849, and practised until 1867—in the interval he drafted the Common Law Procedure Acts of 1852 and 1854—when he accepted the position of legal adviser at the Colonial Office. From 1870 to 1874 he was assistant under-secretary for the colonies. He was returned unopposed as member for Midhurst (1874-85), and subsequently sat for Hampstead (1885-8), until he was raised to the peerage as Baron Knutsford. A viscounty was bestowed upon him in 1895. He was appointed financial secretary to the Treasury in July 1885. In September of the same year he was transferred to the Education Department as vice-president, and retained this position till January 1886. He entered

the second Salisbury administration in August 1886 as vice-president of the Education Department; but in January 1887 he succeeded Mr. E. Stanhope as Secretary of State for the Colonies, and was admitted to the cabinet (1887-92). In this capacity he presided over the Colonial Conference held in London in 1887, and carried through the bill which conferred constitutional government on W. Australia (1890).

Knysna, div. and tn., Cape Colony, British S. Africa. The division is a long and narrow strip lying along the s. coast. The harbour is accessible only to steamers of shallow (14 ft.) draught. Pop. of div. (1904) 9,333; tn., 957.



Koala.

Koala, or NATIVE BEAR (*Phascolarctus cinereus*), a clumsy and heavily-built marsupial, chiefly arboreal in habits, found in E. Australia, where it inhabits eucalyptus or 'blue gum' trees, is purely vegetarian in habit, and of a general ash-gray colour. The tail is absent, the ears large and fringed, the fur very thick. The body is about two feet long, and the animal, in spite of its clumsy appearance, is an excellent climber. In the fore feet two of the digits are opposable to the other three, and in the hind feet the great toe is placed far back, and is large and broad. Both it and the other four toes are furnished with strong nails, as are also the digits of the fore feet. Cheek pouches are present, and the koala structurally resembles the phalangiers, to which it is most nearly related.

Kobdo, tn., W. Mongolia, 220 m. w. of Uliassutai, in 48° N. lat. and 90° 35' E. long. The town (much damaged in 1872 during the Dungan revolt) is composed of two fortresses, a town of merchants, and a sort of nomad suburb, where a floating population of Mongols live in tents. Pop. 6,000. The plateau of Kobdo occupies the south-western angle of Mongolia, between the Altai, Khangai, and Sailughem Mts. It has a length and breadth of about 120 m., and its mean elevation is of about 3,900 ft. The towns of Uliassutai and Kobdo both stand on the plateau.

Kobé, tn., Japan, Honshiu, on w. shore of Osaka Bay, 16 m. w. of Osaka. Since 1892 it has formed with Hyogo one town. It was opened to foreign trade in 1868, and Kobé became the foreign residential quarter. Its harbour is both deep and capacious. It also possesses an imperial shipbuilding yard, and ranks first amongst Japanese ports, both in number of ships and in volume of trade. Pop. (1898) 215,780.

Koblentz, fort. tn., Prussia, cap. of prov. Rhineland, at the confluence of the Rhine and the Moselle, 57 m. by rail s.e. of Köln (Cologne). Since 1870 the town has lost a great deal of its military importance, and in 1890 the town walls were demolished. The royal palace was built in 1778-85 by the last Elector of Trier (Trèves). At the extremity of the tongue of land between the Rhine and the Moselle the province of Rhineland erected in 1897 an imposing monument to the Emperor William I. Public gardens, adorned with a statue of the poet Max von Schenkendorf (who died here in 1817), run alongside the Rhine. The Castor church, originally founded in 836, was rebuilt in the 12th century; the Florinus church dates from the 12th century, and the church of Our Lady from 1431. The industries include champagne cellars, piano factories, and paper factories. The strategic value of this position was recognized by the Romans in the 1st century B.C. In 1632 the town was taken by the Swedes, but was stormed by the Imperialists in 1636; in 1638 it was partly destroyed by the French. Pop. (1900) 45,147. See EHRENBREITSTEIN.

Kobold. See GOBLIN.

Kobrin, chief tn., Grodno gov., S. Russia, 100 m. s.e. of Grodno city. Its industries include milling, tanning, and brick-making. Pop. (1897) 10,355, chiefly Jews.

Koburg. See COBURG.

Koch, also known as PALI or RAJBANSI, aboriginal race of N.E. Bengal and Assam, and the feudatory state of Kuch (Koch) Behar. The Koch established their dominion after the overthrow of the Aryan kingdom of Kamrup in 1489. They are said to number about two millions.

Koch, ROBERT (1843), German bacteriologist, was born at Klausthal, Hanover. As early as 1876 he isolated the bacillus of anthrax, and some years later proposed a method of preventive inoculation against that disease. In 1882 he demonstrated the bacillus of tubercle, which bears his name; and in the following year, in Egypt and India, in the comma bacillus identified the cause of cholera. Tuberculin (which he prepared in 1891) is of

value as a diagnostic agent, but as a remedy for phthisis and kindred human affections it has not fulfilled the high hopes entertained on its introduction. At the present time, strangely enough, Koch is at variance with the great majority of those who may fairly be called his pupils. He holds that tuberculosis in man is a disease distinct from tuberculosis in cattle and other lower animals, and he denies the possibility of the transmission of that disease from lower animals to man. The balance of evidence is against his view. The interim report of the English Royal Commission on Tubercle (published June 1904) proves conclusively that tubercle may be transmitted from man to lower animals, and shows that no distinction can be drawn between cases thus experimentally produced and those occurring in the ordinary way. In 1885 Koch was appointed professor at the University of Berlin, and in 1891 director of the Bacteriological Institute in Berlin. Twice, in 1896 and in 1903, he has gone to S. Africa to study rinderpest, and in 1897 he went to German E. Africa to study malaria. He has written *On Cholera Bacteria* (Eng. trans. 1886), *On Bacteriological Investigation* (Eng. trans. 1891), *Investigation of Pathogenic Organisms* (Eng. trans. by Horsley, 1886), and other works.

Kochi, tn., Japan, Honshiu, on s.e. coast of Shikoku, 135 m. s.w. of Kobé; is noted for its coral, and for its long-tailed fowls. It is the centre of the Japanese paper-making industry. Pop. (1898) 36,511.

Kock, CHARLES PAUL DE (1794-1871), French novelist, was born at Paris. He published about one hundred novels, in which, in witty, vulgar, and realistic fashion, he described low and middle class life in Paris. He became immensely popular abroad, and many of his novels were translated into English. His life was spent almost entirely in Paris. Among his best works are *Georgette* (1820), *Gustave*, and *Mon Voisin Raymond*. See Trimm's *La Vie de C. Paul de Kock* (1873).

Kodak, a portable photographic camera, of which many forms are made by the Eastman Co., the proprietors. The latest development consists in a folding pocket kodak, equipped with a fine, rapid rectilinear lens, brilliant reversible finder, and accurate focussing scale. It is supplemented by the kodak daylight developing machine, which develops kodak films in daylight, gaslight, or any light, thus enabling the whole process to be done without the use of a dark room. Kodoid plates are light,

thin, flat, and unbreakable, and are attached to card supports at the edges by metal clips. See PHOTOGRAPHY.

Kodiak, isl. lying off Cook Inlet, Alaska, 500 m. from Sitka; about 100 m. long by 50 m. wide. It is lofty and bare in the interior. Large quantities of furs are shipped, and immense quantities of salmon are taken in the Karluk R., on the w. coast, and tinned there.

Kodungalur, or CRANGANORE, tn., Cochin state, Madras, India, 18 m. N. of Cochin. Tradition, probably erroneously, points to it as the scene of the labours of St. Thomas (52 A.D.). Early in the 9th century settlements were established here by Syrian Greeks and by Jews. The Dutch took it from the Portuguese in 1661. In 1776 it was captured by Tipu, who destroyed it in 1789. At one time its harbour was considered the most important on the Malabar coast, but is now of little importance. Pop. (1901) 29,140.

Koesfeld, tn., Westphalia, Prussia, 19 m. w. of Münster. Ludgeri Castle, at one time the residence of the bishops of Münster, and Castle Varlar, the seat of Prince von Salm-Horstmar, are in the vicinity. The town manufactures woollen goods, and has sawmills. Pop. (1900) 7,445.

Kofu, tn., Honshiu, Japan, 80 m. s.w. of Tokyo. Its chief industry is that of silk. A kind of sweetmeat, consisting of grapes coated with sugar, is largely made; excellent red and white wines are produced; and rock crystals are cut and polished. There are many fine buildings. Pop. (1898) 37,561.

Kohat, tn., Kohat dist., Punjab, India, at the s. base of the Afridi Hills, 37 m. s.w. of Peshawar. Pop. (1901) 30,762. The district has an area of 2,771 sq. m., and a population in 1901 of 217,865. There are salt mines.

Koh-i-nur, a magnificent diamond whose known history begins early in the 14th century; weighs about 102 carats. It was long the property of the Grand Mogul at Delhi, where Tavernier saw it (1665). The Persians took possession of it (1739); then it passed to the Afghans, and was finally brought to Lahore. On the annexation of the Punjab (1850) the diamond became the property of Queen Victoria. The name Koh-i-nur is Persian, and signifies 'mountain of light.'

Kohistan, geographical name applied to mountainous districts of Persia, Afghanistan, and India. In the latter country it indicates the mountains to the N.W. of India, between the Indus and Chitral valleys, and the region extending from the w. of Sindh into Baluchistan.

Köhler, REINHOLD (1830-92), German author, born at Weimar; studied philology at Jena, Leipzig, and Bonn, and from 1857 was attached to the grand-ducal library of his native place. He was one of the most learned men of his day, and excelled especially as a folklorist. He was also a student of Shakespeare. He wrote *Dantes Göttliche Komödie* (1865) and *Herders Cid* (1867), and edited books of popular tales.



Kohl-rabi.

Kohl-rabi (*Brassica caulorapa*) is a member of the cabbage family, and is largely cultivated in Italy and Germany on account of its swollen, fleshy, turnip-like stem. This swollen part is of most value when quite young, and has much the flavour of turnip. In England it has been little grown, though its hardness and its tolerance of hot, dry soils gives it an advantage over the turnip in some seasons and localities. Mr. Wythes recommends the early purple Vienna as the most useful variety for general garden cultivation. Seed should be sown in March and early June, in drills fifteen inches apart, the plants being thinned so as to leave eight inches from plant to plant in the row. The first sowing will provide a summer supply, the second a supply for autumn, and, if stored so as to be just free from frost, a winter supply as well. In India this vegetable is valued as a basis for soup.

Kohlrausch, FRIEDRICH (1840), German physicist, was born at Rinteln, and after holding several chairs of physics (e.g. Göttingen, Würzburg, Strassburg) was appointed (1895) president of the Imperial Technical College at Charlottenburg. Besides numerous monographs on physical subjects, chiefly in connection with the theory of electrolysis, he has published *Leitfaden der praktischen Physik* (1870; 10th ed. 1905) and *Leitvermögen der Electrolyte* (1898). The former of these is an invaluable text-book, and has been translated into English under the title of *An Introduction to Physical Measurements* (3rd ed. 1894).

Kokomo, city, Indiana, U.S.A., co. seat of Howard co., 60 m. N. of Indianapolis. Its industries include glass-making, lumber products, rubber goods, wood pulp, and paper. Pop. (1900) 10,609.

Koko-nor, or KUKU-NOR, lake and region of Central Asia. The lake lies in lat. 36° 58' N., and long. 99° 55' E., at an altitude of 9,950 ft., and is surrounded by mountains. It is 60 m. in length by 40 m. in breadth. The region lies between Tibet, China, and the Gobi desert, and is sometimes understood to include not only the basin of Koko-nor itself, but also Tsaidam and the upper valley of the Hwang-ho, with the plateau of Odontala, where that river rises. In this wider sense it is bounded on the N. by the Nan-shan, Altin-tagh, and Tugus-daban ranges, all belonging to the N. Kuenlun system; on the S. by the S. Kuenlun mountains; and on the E. by the Chinese province of Kan-su.

Kokra Wood, a hard wood, very close grained, obtained from the Burmese tree *Aporosa dioica*, belonging to the order Euphorbiaceæ. The term is sometimes applied to the wood of the West Indian leguminous tree *Inga vera*.

Kokstadt, administrative centre of Griqualand East, a native district lying between Cape Colony and Natal, British S. Africa. It stands 92 m. S.W. of Pietermaritzburg.

Kola or Guru Nut, the fruit of a tropical African tree, *Cola acuminata*, belonging to the order Sterculiaceæ. The nuts are rather larger than walnuts, and have a very bitter taste. They contain a large quantity of caffeine, and are eaten by the natives as a stimulant, which enables them to accomplish feats of endurance, and also to stave off the demands of hunger.

Kola. (1.) Town, Archangel gov., N. Russia, former cap. of the Kola or Russian Lapp peninsula, at the head of the Gulf of Kola, lat. 68° 53' N., and long. 33° 1' E. In 1899 it was superseded as capital by the new port of Alexandrovsk or Ekaterininsk, near the mouth of the Gulf of Kola. Pop. (1897) 615. (2.) District, comprises the Murman coast and the whole peninsula commonly called Russian Lapland, bounded by the Arctic Ocean, the White Sea, the frontier of Finland, and Norway. Imandra is the chief lake.

Kolaba, or COLABA. See BOMBAY.

Kolapur. See KOLHAPUR.

Kolar. (1.) Town, cap. of Kolar dist., Mysore, India, 43 m. E. of Bangalore, with manufactures of coarse blankets. Pop. (1901) 12,210. The district has an area of 2,845 sq. m., and a popula-

tion (1901) of 685,396. Kolar gold fields had in 1898 an output exceeding 400,000 ounces. The Gold Fields municipality had a population (1901) of 38,204. (2.) Fresh-water lake on the boundary of Kistna and Godavari districts, Madras Presidency, India. During the monsoon it covers an area of 100 sq. m.

Kolarian, a conventional term first applied in 1866 by Sir George Campbell to numerous hill tribes of Central India (Chota Nagpur, the Vindhya uplands, Mirzapur, etc.), who are regarded by many as the true aborigines of the peninsula, or at least its earliest known occupants. The physical type differs little, if at all, from that of the other inhabitants of the same region; but all speak closely-related dialects of the same stock Kol or Munda language, which differs profoundly both from the northern Aryan (Sanskritic) and the southern Dravidian. In 1901 there still survived ten groups of distinctly Kolarian speech, collectively numbering 3,179,275, distributed as follows: Santali (Hos), 1,790,521; Kol (Munda), 948,687; Savara, 157,136; Kharia, 101,986; Korku, 87,675; Gadaba, 37,230; Kora, 23,873; Korwa, 16,442; Juang, 10,853; Asur, 4,872. The word *kol* is the basis of our word *coolie*, due to the readiness with which these people lend themselves to the contract system. The distinction between Kolarians and Dravidians is not, however, recognized by several leading anthropologists. They propose the expression 'Dravido-Munda family' as the collective name of both. In their valuable reports in the census returns for 1901, Messrs. E. A. Gait and H. H. Risley adopt this view. But there can be no manner of doubt that the difference is radical in the strictest sense of the term. Apart from a few loan words, the vocabularies have nothing in common, while the accent and general morphology differ *toto caelo*. Dravidian is a moderately agglutinating form of speech already well advanced towards true inflection, like, for instance, Basque or Finnish. But Munda is a purely agglutinating tongue of an extreme type like Turkish or Jagatai. This is, indeed, acknowledged by Mr. Risley himself. See Dr. R. Caldwell's *The Languages of India* (1875); E. T. Dalton's *Descriptive Ethnology of Bengal* (1872); Report of the Ethnological Committee of the Central Provinces (1868); W. Crooke's *The North-Western Provinces of India, their History, Ethnology, and Administration* (1897); A. H. Keane's *Man, Past and Present* (1900); *Census of India*, 1901 (2 vols. 1903).

Kolbe, HERMANN (1818-84), German chemist, born at Elliehausen, near Göttingen; studied chemistry under Wöhler. From 1842 he assisted Bunsen, whom he succeeded in the chair of chemistry at Marburg in 1851, being transferred in 1855 to the University of Leipzig, where he remained till his death. His *Lehrbuch der organischen Chemie*, his contributions to Liebig's *Handwörterbuch der Chemie*, and his editorial criticisms in the *Journal für praktische Chemie*, are among the principal of his publications.

Kolberg, seapt. and seaside resort in Prussian prov. of Pomerania, 2 m. from the Baltic coast, and 76 m. by rail N.E. of Stettin. Formerly capital of duchy of Cassubia and one of the oldest towns in Pomerania, Kolberg was strongly fortified. The industries include iron-founding and machinery-making, sawmilling, tobacco manufacture, and fishing. Pop. (1900) 20,200.

Kolding, mrkt. tn., Jutland, Denmark, at mouth of Kolding R., 13 m. by rail S.W. of Fredericia. Kolding dates from 1288, when the Gray Friars established a cloister. It was the scene of a drawn battle in April 1849, between the Danes and the Schleswig-Holsteiners. Near the town, till 1808, stood the ancient fortress of Koldinghus. Pop. (1901) 12,516.

Kolhapur, or KARVIR, cap. of a feudatory state, Bombay Presidency, India, 97 m. W. of Bijapur. The picturesque town contains the remains of several Buddhist shrines dating from the 3rd century B.C. Pop. (1901) 54,373. Kolhapur State has an area of 2,816 sq. m., and a population (1901) of 910,001. It has manufactures of cottons, woollens, hardware, and pottery, and is a well-governed and progressive state.

Kolin, tn., Bohemia, Austria, on the Elbe, 38 m. by rail E. of Prague. It is a centre of the Bohemian sugar industry, and manufactures chemicals, ironmongery, and beer. Here, on June 18, 1757, Frederick the Great was defeated by the Austrians. Pop. (1900) 15,025.

Kolivan, tn., Tomsk gov., Siberia, 5 m. W. of the river Ob, and 120 m. S.W. of the town of Tomsk. Pop. (1897) 11,703.

Kollar, JAN (1793-1852), Slovak poet, born at Mossoez (Thurocz co.), Hungary, was a pastor in Pesth (1819-49), then professor of archæology at Vienna until his death. His writings did much to awaken the national feelings of the Slovaks in particular, and the sense of community of race among the Slavs in general. The most important of these were *Slávny Deera* (1816), a series of original sonnets; *Národnice*

Zpiewanky (1832-3), a collection of Slovak folk-songs; *Dobré Vlastnosti Narodu Slovanskeho* (1822), a eulogy on the Slavs; and (in German) *Ueber die litterarische Wechelsichtigkeit zwischen den Stämmen und Mundarten der Slavischen Nation* (1831).

Kölliker, ALBRECHT VON (1817), German-Swiss histologist, born at Zürich, became professor of anatomy at Würzburg (1847-1902). His *Handbuch der Gewebelehre des Menschen* (6th ed. 1898-1902) is still the standard work on the histology of man. He is also responsible for the *Challenger Report* on Pennatulida (1870), and has published a work on the *Siphonophora* (1853). His interest in general zoology is further attested by the volumes of the *Zeitschrift für wissenschaftliche Zoologie*, started by himself and Von Siebold in 1849.

Kolmar, or COLMAR, tn., Germany, near the l. bk. of Ill, in Upper Alsace, 40 m. by rail S.S.W. of Strassburg. It still retains several houses of the 16th and 17th centuries. Kolmar is the seat of a busy manufacture of cottons, woollens, silks, cloth, jute, thread, machinery, and dyeing and brewing. It was in the possession of France from 1680 to 1871. Pop. (1900) 36,844.

Köln. See COLOGNE.

Kölnische Zeitung, a German journal which has appeared for upwards of two hundred years. In 1809 it was suppressed by Napoleon, and was not revived until the expulsion of the French in 1813. The foundation of its popularity and success was laid in 1830, when, during the revolution of that year, it showed great enterprise in obtaining the latest news from France; and its influence was widely extended by Joseph Dumont, who, in 1847, took over the direction of the journal. It has always been an advocate of the Liberal cause, and in later years became the medium for the inspired utterances of Bismarck and his successors in the chancellorship. It was the first German paper to introduce the leading article, and another prominent feature is its full reports of the proceedings in the German Reichstag. It publishes three editions daily.

Kolo, tn., Kalisz gov., Russian Poland, on the Warthe, 40 m. N.E. of Kalisz. Pop. (1897) 9,359.

Kolobeng, station in Bechuanaaland, British S. Africa, 190 m. N.E. of Vryburg; formerly the mission station of David Livingstone (1849).

Kolomea, tn., Austrian Galicia, 43 m. by rail N.W. of Czeronowitz, on the l. bk. of the Pruth, with petroleum, pottery, and candle industries. Pop. (1900) 34,188.

Kolomna, walled tn., Moscow gov., 60 m. S.E. of Moscow city. It is the seat of a Greek orthodox bishop, and has tobacco, silk, calico, wool, linen, leather, earthenware, and tile industries. It manufactures the celebrated marmalade called *postilla*. Pop. (1897) 20,970.

Kolozsvár (Ger. *Klausenburg*), tn. and episc. see of Hungary, chief tn. of co. Kolozs in Transylvania, 95 m. by rail S.E. of Nagy-Varad (Grosswardein); was founded by Saxon colonists in 1272, and for ages was the capital of Transylvania. It has two bishops, one of the Unitarian, the other of the Reformed Church. The chief features of the place are its old churches, its citadel (1715), and university. Pop. (1900) 46,670.

Kolpino, tnshp. of St. Petersburg gov., N.W. Russia, 16 m. S.E. of the imperial capital; is an important industrial centre, with sawmills, copper and iron foundries, manufactories of steam-engines, army weapons, and cement. Pop. (1897) 8,076.

Koltsov, ALEXEI VASILIEVITCH (1809-42), 'the Russian Burns,' the son of a cattle dealer at Voronej. He taught himself, managed his father's business, and published verses, which were collected after his death (1846). He is the poet of the steppe and of peasant life.

Kolyma, river of E. Siberia, rising in the Stanovoi range, flowing N.E. for 1,000 m., and discharging into the Arctic Ocean.

Kolyan. See KOLIVAN.

Komarom (Ger. *Komorn*), chief tn. of Komarom co., Hungary, at the confluence of the Vag (Waag) with the Danube, 65 m. by rail N.W. of Budapest. It was first fortified by Matthias Corvinus, but was reformed in 1805-8; it successfully resisted the Turks in 1594 and 1663, and the Austrians in 1848-9. The novelist Jokai was born here in 1825. Pop. (1900) 16,816.

Komati. (1.) River of S.E. Africa, entering Delagoa Bay from the N. It drains the N. part of the Drakenberg range. (2.) KOMATI POORT, pass on the E. frontier of the Transvaal Colony, British E. Africa, traversed by the Delagoa Bay Ry.

Komorn, Hungary. See KOMAROM.

Komotau, tn., Bohemia, Austria, 79 m. by rail N.W. of Prague, at the southern foot of the Erzgebirge. Lignite mining and fruit cultivation. Pop. (1900) 15,925.

Konakry, seapt. and cap. of French Guinea, W. Africa, on the island of Tombo, is connected with the mainland by an iron bridge. A railway is in course of construction between the town and the Niger.

Kong. (1.) Town, Kong country, French Ivory Coast, W. Africa, in 8° 53' N. and 4° 10' W. It has a trade in cloth and gold. Pop. 15,000. (2.) The supposed Kong Mts., parallel with the Guinea coast of W. Africa, have been shown by the expedition of Binger (1888) to be non-existent. The district consists of isolated mountain tracts, with peaks attaining 6,000 ft., the whole forming a plateau region.

Kongsberg, tn., Norwegian co. of Buskerud, on the Laagen, has royal silver mines, discovered in 1623, and an arms manufactory. Here is one of the most beautiful churches in Norway. Pop. (1900) 5,585.

Konieh, or **KONIA** (anc. *Iconium*), tn., Asiatic Turkey, 143 m. S. of Angora, in the midst of orchards. From the date of the capture of Nicæa by the crusaders (1097) down to the time of Jenghiz Khan, it was the capital of the Seljuk (Turkish) sultans. Paul and Barnabas on their first missionary journey preached here (Acts 13: 51, ff.). The manufactures consist of woollen goods, carpets, and leather. It is the seat of a Greek archbishop. Pop. 44,000. See **ICONIUM**.

König, FRIEDRICH (1774-1833), German inventor, born at Eisleben in Saxony. With the help of English capital he patented a steam printing-machine (1810), also a cylinder press, which turned out 1,100 copies of the *Times* in an hour. Returning home (1817), he established near Würzburg a factory for making printing-presses, which became known all over Europe.

Königgrätz, tn. and episc. see of Bohemia, Austria, 79 m. by rail E. of Prague, on the Elbe. The Gothic cathedral (Roman Catholic) was founded in 1302. Here was fought, on July 3, 1866, a battle (also known as Sadowa) in which the Austrians sustained a crushing defeat by the Prussians. Pop. (1900) 9,773.

Königinhof, tn., Bohemia, Austria, near l. bk. of Elbe, 34 m. by rail N. of Pardubitz; carries on cotton and linen manufacture and brewing. Pop. (1900) 10,601.

Königsberg, fort. tn., Prussia, cap. of prov. E. Prussia, on the Pregel, 4½ m. from the north-eastern end of Frisches Haff, and 25 m. from the Baltic, with which it is connected by a new (1900) canal to Pillau, its outer port. The second capital and place of residence of the kings of Prussia, Königsberg is the most important town in the N.E. of the monarchy. The royal palace was formerly a castle of the Teutonic knights. It houses the provincial supreme court, the archives, and the museum of antiquities. The university, founded

in 1544, was attended by nearly 1,018 students in 1904. Here the philosopher Kant lived and taught. The Gothic cathedral (of the bishops of Samland) was begun in 1333. In the palace chapel Frederick I. crowned himself first king of Prussia in 1701. Almost every one of the mediæval buildings has been destroyed or modernized. Industry embraces the making of machinery, iron-founding, printing, the manufacture of tobacco, cloth, linen, sugar, flour, wood pulp, chemicals, etc., sawmilling, oilseed-crushing, brewing, tanning, and the production of bricks and lime. Königsberg exports corn, timber, flax, hemp, flour, sugar, etc., and imports coal, iron, herrings, and building materials to an aggregate value of over £10,000,000 annually. The town grew up round the castle (1255) of the Teutonic knights, and from 1457 it was the place of residence of the grand masters of the order, and from 1525 to 1618 of the dukes of Prussia. Previous to 1724 the three parts of which the present town consists were each a separate municipality. Pop. (1900) 189,483.

Königsthal, tn., Moravia, Austria, 4 m. by rail N.W. of Brünn. Pop. (1900) 11,022.

Königshütte, tn., Prussian Silesia, 6 m. by rail S.E. of Beuthen, and some 7 m. from the Russian frontier. It has extensive iron, steel, and zinc works, and stands amidst the coal mines of Upper Silesia. Pop. (1900) 57,919.

Königsmark, PHILIPP CHRISTOPHER, COUNT (1662-94), Swedish officer and associate of Augustus of Saxony, had an intrigue with Sophia Dorothea, wife of George of Hanover (George II. of England). He is supposed to have been assassinated on the discovery of the affair. — **MARIE AURORA** (1670-1728), his sister, was born at Stade in N. Germany; became the mistress of Augustus II. of Saxony, and by him mother of Marshal Maurice of Saxony. From 1697 to her death she was abbess of Quedlinburg.

Königssee, lake in Bavarian prov. of Upper Bavaria, 2½ m. above Berchtesgaden, at an altitude of 2,000 ft. It is shut in by rocky mountain (Watzmann, etc.) walls 4,500 ft. high, is 17 m. in circuit, and 610 ft. deep.

Königsstuhl, castle beside the Rhine, Germany, on l. bk., 5 m. S. of Koblenz, at a spot where the territories of the four Rhenish electors (Cologne, Treves, Koblenz, and Palatine) met. Here, from early ages down to the beginning of the 15th century, the electors sometimes assembled to choose the future emperor. The original castle was built in 1376 and restored in 1843.

Königstein, tn., kingdom of Saxony, 22 m. by rail S.E. of Dresden. Its citadel, on a precipitous rock (450 ft.), has frequently served as a place of refuge for the royal family—e.g. in 1849. It is used partly as a repository for archives, etc., partly as a state prison. Pop. (1900) 4,274.

Königswart, summer resort of Bohemia, Austria, 5 m. by rail N.W. of Marienbad, with mineral springs, mud baths, and a 17th-century castle. Pop. (1900) 2,039.

Königswinter, tn. and summer resort, Prussia, prov. Rhineland, on r. bk. of the Rhine, 6 m. S.E. of Bonn, at foot of Siebenbirge. Birthplace of the poet W. Müller von Königswinter (1816-73). There are stone quarries. Pop. (1900) 3,804.

Koniscopes, an instrument invented by John Aitken to test the purity of the air as regards dust. It consists essentially of an air-pump and a test tube with glass ends. At one end of the test tube is a passage communicating with the air-pump, and near the other end is a stopcock. The tube being pointed towards the sky or any other source of light, the stopcock is shut, and one full stroke of the pump is made. The inside of the tube being lined with blotting paper kept moist, condensation of vapour at once takes place on the particles, and the resultant colour phenomena are produced. If there is little dust in the air, one stroke of the pump will make the light in the test tube first blue, then green, then yellow; and then a second stroke, blue and green, finishing up with yellow. On the other hand, should the air contain a large quantity of dust, one stroke will not give the whole series of colours, but may stop at the blue. See *Proc. Roy. Soc.* (vol. li. p. 435).

Konitz, tn., Prussian prov. W. Prussia, 81 m. by rail S.W. of Danzig; with sawmills, flour mills, iron foundries, and woollen factories. Pop. (1900) 10,697.

Konkan, a strip of country about 200 m. in length along the W. shore of the Bombay Presidency. The breadth varies from 1 to 50 m. The country, which is generally level and fertile, consists of rice fields, coconut plantations, and salt pans. Its area is 17,000 sq. m.

Konotop, tn., Chernigov gov., S.W. Russia, 70 m. E.S.E. of Chernigov city. From 1635 to 1648 it was the leading Polish frontier fortress. Pop. (1897) 23,083.

Konrad von Wurzburg. See **CONRAD VON WARZBURG**.

Konskie, or **KONSK,** tn., Radom gov., Russian Poland, 53 m. S.W. of Radom town. There are forges, iron works, and wagon factories. Pop. (1897) 8,235.

Konstanz, or **CONSTANCE**, tn., Germany, grand-duchy of Baden, on N. shore of Lake of Konstanz, at the point of efflux of the Rhine, 89 m. by rail E. of Basel. The most noteworthy edifices are the cathedral (begun in 1052) and the church of St. Stephen (15th century). The Dominican monastery, in which Huss was imprisoned 1414-15, is in part converted into a hotel. Other ancient buildings are the chancellery (1593), the house in which the Emperor Barbarossa (Frederick I.) signed the treaty of peace (1183) with the Lombard League; the guild-house of the butchers, now the Rosgarten Museum; and the merchants' exchange (1388). Chief products of industry are cottons, linen, sacking, machinery, chemicals, and hardware. The remains of prehistoric pile dwellings have been discovered in the lake. The Romans settled here in the 4th century or earlier. From the 6th century down to 1821 Konstanz was an episcopal see. In the second half of the 19th century it was a stronghold of the Old Catholic movement. Pop. (1900) 21,445.

Koodoo. See **KUDU**.

Koorringa. See **BURRA**.

Kootenay. (1.) River, British N. America, rises in the Rocky Mts., and flows at first s., nearly parallel to the Columbia; then after making a loop into Montana and Idaho, flows through Kootenay Lake, and joins the Columbia after a course of 400 m. Throughout its basin gold is found, and there are rich deposits of iron. Its navigation is obstructed by rapids. (2.) Lake, British Columbia, about 60 m. long, and from 1 to 4 m. wide.

Kopais (anc. *Topolias*), former lake or marsh, Boeotia, Greece, which received the waters of the Cephissus. In 1893, by means of tunnels through the mountains, it was drained, and nearly 100 sq. m. reclaimed; it is now a fruitful and salubrious plain.

Kopek, or **COPEK**, a Russian copper coin worth the hundredth part of a rouble (= 2s.).

Köpenick, or **CÖPENICK**, tn., Prussian prov., Brandenburg, 8 m. by rail s.e. of Berlin, on an island of the Spree, with manufactures of shoddy, sealing-wax, carpets, sugar, dye works, saw and flour mills. Pop. (1900) 20,925.

Kopp, **HERMANN** (1817-92), German chemist, was born at Hanau. After working with Liebig at Gießen, he was appointed, jointly with Will, to the chair of chemistry in 1852, but removed in 1863 to Heidelberg, where he retained the professorship till his death. His principal researches were on physical chemistry, particularly on the boiling points of liquids and on specific volume; and he

did much to connect the chemical composition and physical properties of substances. He is also well known for his *Geschichte der Chemie* (1843-75). He edited (from 1847) a section of Liebig's *Jahresbericht und Annalen der Chemie und Pharmacie* (1851-71), and wrote *Einführung in die Kristallographie* (1849), and part of a text-book of theoretical chemistry.

Kopparberg, tn., Örebro co., Sweden, close to Falun, with lead, zinc, copper, and iron mines. See **FALUN**.

Kopreinitz, Hungary. See **KAPRONCZA**.

Köprülü (anc. *Bylazora*), tn., Turkey in Europe, on riv. Vardar, 27 m. s.s.e. of Usküb; has trade in silkworms. Pop. about 15,000.

Köprülü, or **KÖPRILI**, an Albanian family of Turkish statesmen, the most notable of whom were: (1.) **MOHAMMED** (1585-1661), created grand vizier (1656) at the age of seventy, and, at the head of an army remodelled by himself, took Lesbos and Tenedos from the Venetians; fortified the Dardanelles (1637-61); and reduced Transylvania, after capturing the fortress of Grosswarden. (2.) **AHMED** (1630-76), son of the above, grand vizier at the age of twenty-six, did much to prop up the sinking Turkish state; invaded Transylvania (1663), and though defeated by the Imperialists under Montecuccoli at Saint Gotthardt, imposed the peace of Vasvár on the emperor, whereby Grosswarden and Neuhausel were abandoned to the Turks. (3.) **MUSTAFA** (? 1640-91), brother of the above. When the rebellion against Sultan Mohammed IV. burst forth, Köprülü saved the life of the Sultan's younger brother, Soliman III., at whose accession (1699) he was made grand vizier. He assisted in placing Emerich Tököly on the throne of Hungary, drove the Imperialists out of Servia and Bosnia, and in 1699 replanted the Crescent on the bastions of Belgrade. On Aug. 9, 1691, he was defeated and slain by the Prince of Baden at the battle of Salankemen. (4.) **HUSEIN** (? 1620-1702), younger brother of Mohammed, was in 1697 made grand vizier by Sultan Mustafa II. Realizing the inability of Turkey to cope with the Imperialists under Prince Eugene, he concluded the treaty of Carlowitz (1699). See Brosch's *Geschichten aus dem Leben dreier Grosswesire* (1899).

Kopsia, a genus of tropical evergreen trees or shrubs belonging to the order Apocynaceae, all natives of the Malay region. They bear beautiful cymes of white or reddish bell-shaped or salver-shaped flowers. *K. fruticosa* is the species usually seen in cultivation. It requires stove heat and a light, peaty soil. It may be propagated by means of cuttings.

Korah, an Israelite who rebelled against the authority of Moses and Aaron, and who, with all his following, was destroyed by an extraordinary manifestation of divine power. See Driver's *Introduction*, 59 ff., and commentaries given at article **NUMBERS**.

Korān, the sacred book of Islam, is made up of those revelations which its founder professed to have received direct from God. The revelations, begun in the solitude of the cave at Hira, were continued from time to time during the prophet's life. But Mohammed did not write the Koran himself; it was compiled after his death by his secretary, Zaid-ibn-Thabit, under the orders of the khalifa, Abu Bekr. It is written in Arabic, and to all true believers this is the only authorized version. The book consists of 114 suras, or chapters, which vary in length from a few lines to many verses. In the earliest compositions we discover the fragmentary impassioned utterances of an embryo prophet—appeals to his countrymen to return to the worship of God, 'the Compassionate, the Merciful.' In the second group the unity of the Godhead is proclaimed, idolatry is denounced, and vivid pictures are drawn of judgment, of heaven, and of hell. In the third series Mohammed lays stress on the divine character of his mission. In the next group—Mecca suras—we find a militant Islam appealing to the arbitrament of the sword; and finally, in the Medina suras, Islam triumphant: fasts, festivals, and the pilgrimage to Mecca are instituted, and the slaughter of all 'infidels' is authorized. See *The Kurān* (translated into English by E. Sale, 1870), and *The Koran, its Composition and Teaching*, by Sir William Muir, of which several editions have been published.

Koranna, nomad half-breed Hottentots and Bushmen, living along the Orange R., and in the north of Carnarvon dist., Cape Colony. In 1882 they revolted, and had to be put down by force.

Korat, tn., Siam, 170 m. N.E. of Bangkok. Pop. 6,000.

Kordofan, prov., E. Sudan, between Darfur and White Nile. It is flat in the N., and very hilly in the s. (Jebel Nuba Mts.). During the dry season it is practically desert, but during the wet season (June to October) vegetation is luxuriant. The chief products are groundnuts, cotton, tobacco, and millet; while the principal exports are ostrich feathers, gum arabic, ivory, and ox hides. Pop. 300,000, the most important tribes being the Nubas, Hasanieh, Kababish, and Bagara. Cap. El Obeid.



Korea, CHO-SEN, or DAI-HAN, a country which extends s. of Manchuria, between lat. 34°-43° N. and long. 125°-130° E., forming a peninsula (600 m. long by 135 m. broad) between the Japan Sea and the Yellow Sea, of about 90,000 sq. m. in area. A range of mountains (highest point, 8,700 ft.), closely following the E. coast, leaves only a narrow tract of land for cultivation. But on the W. the mountains slope more gradually; the valleys are fertile, and generally capable of irrigation; the Yalu, Tai-dong, Han, and other large rivers are navigable for some distance; the coast is indented with many bays and harbours, and is lined with islands; the sea is shallow, affected by strong tides. The character of the S. coast is more abrupt, with deeper water. On the E. coast harbours are few, and the sea is almost tideless. The thermometer ranges from 100° F. to below zero; rivers are frozen for months. The rainfall is almost entirely in summer, and varies considerably. In 1901 it was only 4'10 in. at Seoul; but the average is over 20 in.

The people are in features, dress, customs, and architecture distinct from the Chinese and Japanese, but affect Chinese literature. The magnificent sea fisheries are left to Chinese, Japanese, and Russians. The people are robust and well made, and are fond of shooting and fishing.

The language is Ural-Altaic. It resembles Japanese in structure, but they have few vocables in common. There is scarcely any Korean literature. To all intents and purposes, Chinese is the written language of the country. The Koreans appear to be a mixture of Caucasian and Mongolian races. Early in the Christian era the country was divided into three kingdoms, called Kokuryō (in the N.W.), Pekché (in the S.W.), and Silla (in the E.). The native annals begin 57 B.C., but have little historical value until the second half of the 4th century. At that time Silla conquered Kokuryō and Pekché, and annexed the small Japanese province of Imma, or Mimana, in S. Korea. A period of great prosperity followed. Writing and Buddhism were then introduced from China, to whom Korea owes its civilization and arts such as they are. Early in the 10th century Kokuryō was resuscitated under the name of Koryō (our Korea), and soon became master of the whole peninsula. In the Chinese Yuan dynasty Korea was a vassal of China, and took part in Kublai Khan's disastrous expedition to Japan at the end of the 13th century. In 1392 the present dynasty was founded, and the country was

called Cho-sen. In 1592-7 the Japanese invaded Korea, but were driven out by Chinese. Christianity was introduced at the end of the 18th century, and endured terrible persecutions until relations were opened with foreign countries. In 1876 a treaty was made with Japan, in 1882 with the United States, and in 1883 with Great Britain; and since that date treaties have been made with most of the countries of Europe. China's inaction in 1894 led to her war with Japan, and to the latter's declaration of the independence of Korea. The king in 1899 assumed the title of Emperor of Korea, to which he gave the name Dai-han. At the close of 1903 Russian influence was all-powerful in Korea; but the results of the first year of the Russo-Japanese war placed the country entirely under Japanese authority, and by the treaty of Portsmouth, U.S.A., Korea was formally made a suzerainty of Japan. See RUSSO-JAPANESE WAR.

The opening of the 20th century has considerably developed the trade of Korea. In 1904 the imports, consisting chiefly of cotton goods, woollens, metals, and arms, were valued at £2,736,383, including British goods to the value of £700,000; and the exports — chiefly ginseng, beans, pulse, rice, silk, cattle, and hides — at £707,795, besides £511,396 of gold. Silver, copper, and more recently coal mines are worked. In 1905 the Japanese took steps to begin the cultivation of cotton on a large scale in Korea. A railroad runs from Chemulpo to Seoul, the capital (pop. 200,000) (30 m.); s. from Seoul to Fu-san (267 m.), from Fu-san to Masampo, and from Seoul to the Yalu (300 m.), while several branch lines are under construction. They are all Japanese property. Treaty ports—Chemulpo, Fu-san, Gensan, Mokpo, Chenampo, Kunsan, Masampo, Songchin, Yonampo, and Wi-ju. Pop. estimated at 10,000,000. See W. E. Griffis's *Korea* (1905); Mrs. Bishop's *Korea and her Neighbours* (1898); Angus Hamilton's *Korea* (1904); Carles's *Life in Korea* (1888); Wolter's *Korea, Einst und Jetzt* (1902).

Korea, feudatory state of Chota Nagpur, Bengal, India, with an area of 1,625 sq. m., and a population (1901) of 35,113.

Korets, tn., Volhynia gov., W. Russia, 30 m. W. of Novogradvolinsk. Pop. (1897) 9,600.

Koriaks, a Mongolian tribe inhabiting a district of N.E. Siberia, between the Chukches and the Kamchadales. They number about 5,000. See CHUKCHES.

Korigaum, tn., Bombay Presidency, India, 16 m. N.E. of Poona; scene of a victory of the British over the Peshwa, Jan. 1, 1818.

Körner, KARL THEODOR (1791-1813), German poet and patriot, was the son of Schiller's friend Christian Körner, and was born at Dresden. In 1811 he was appointed, through the kind offices of Kotzebue, dramatist to a Viennese theatre; but when Prussia roused herself against Napoleon in 1813, Körner joined Lützow's 'wilder verwegener Schar,' or black-uniformed guerilla troop, and died the patriot's death at Wöbbelin, not far from Schwerin. He occupies almost a holy place in the hearts of his countrymen by reason of the fiery patriotic songs with which he encouraged his fellow-fighters; they have been collected as *Leier und Schwert* (1814; numerous editions since). He also wrote several bright little plays, such as *Der grüne Heinrich*, *Toni*, *Der Nachtwächter*, and two or three tragedies—e.g. *Zriny* and *Rosamunda*. See *Life* by his father (Eng. trans. by G. F. Richardson, 1845) and by Peschel (1901).

Korneuburg, tn., Austria, prov. Lower Austria, 7 m. by rail N. of Vienna, on l. bk. of Danube. It manufactures wine, and carries on a large trade in corn and salt. Pop. (1900) 8,298.

Körös, riv., Hungary, rises in W. Transylvania, and after a westerly and south-westerly course of 340 m. joins the Tisza (Theiss). Pop. (1900) 9,263.

Korosko, tn., Nubia, Egypt, on E. bank of Nile, about 110 m. S.S.W. of Assuan.

Korsakovsk, tn. on Aniva Bay, island of Sakhalin, E. Siberia, contains a convict prison. Its sheltered harbour is a calling place for steamers plying between Vladivostok and Hakodate.

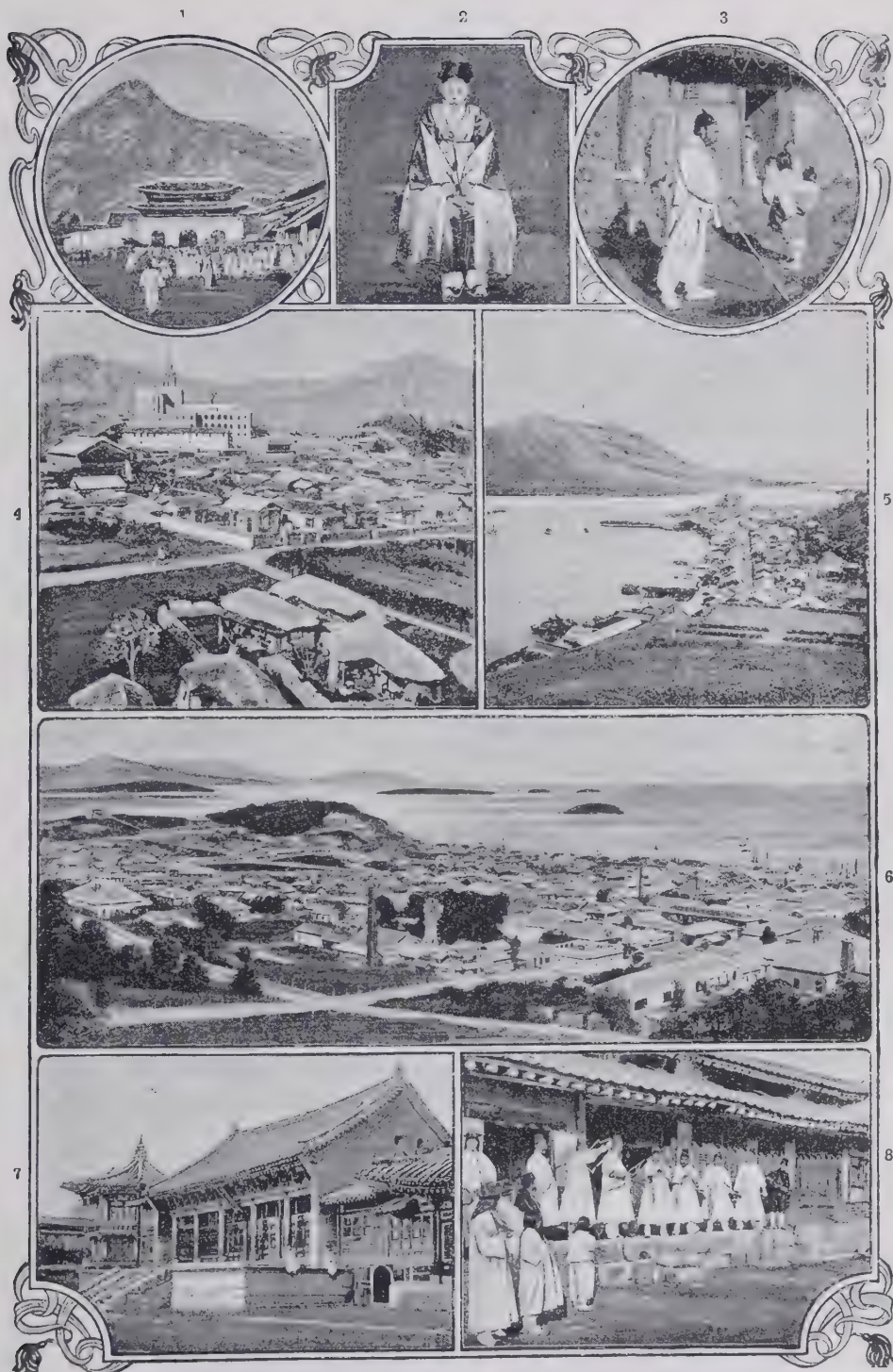
Korsör, seapt. in Sjælland, Denmark, on the Great Belt, the starting-point of the Fünen and Kiel steamers. It exports fish and cattle. The poet Baggensen was born here. Pop. (1901) 6,054.

Kortrijk, Belgium. See COURTRAI.

Korvei. See CORVEI.

Kosciusko, mt. group of Australian Alps, N.S.W., near head of Murray R. The two highest peaks are Mueller's Peak (7,268 ft.) and Kosciusko (7,336 ft.), 36° 28' S., 148° 16' E.

Kosciusko, TADEUSZ (1746-1817), Polish general and statesman, born at Siechnowice in Lithuania; went to America, where he served under Washington, and became the friend of Lafayette; then returning to Poland (1786), he assisted Poniatowski in the war with Russia, distinguishing himself at Dubienka. On Russia's annexation of Poland he retired to Leipzig. On the outbreak of the revolution of 1794 he raised the standard of independence at Cracow as dic-



Scenes in Korea.

1. Main Gateway of old Palace, Seoul; now never opened. (*Review of Reviews*.) 2. Tyo-pung-Sik, President of the Council of Ministers. (*Review of Reviews*.) 3. Korean peasants and cottage. (Photo by Underwood & Underwood.) 4. Seoul. (Photo by Underwood & Underwood.) 5. Fusan. (*Review of Reviews*.) 6. Chemsilpo. 7. Hall of Portraits, old Palace, Seoul. 8. Archers in the old Palace, Seoul.

tator of Poland, defeated the Russians at Raclawice, defended Warsaw for two months, but was defeated and taken prisoner at Maciejowice, though released by the Emperor Paul (1796). After vain endeavours to obtain the independence of Poland, he settled in Switzerland, where he died. He was buried at Cracow. See *Lives* by Falkenstein (1834), Choazko (1837), and Michelet (1833).

Kosel, or **COSEL**, tn., Prussian Silesia, on l. bk. of Oder, 29 m. by rail s. by E. of Oppeln, vainly besieged by the Austrians in 1758, 1753, 1760, 1762, and again in 1807. Pop. (1900) 7,085.

Kösen, wat.-pl. and summer resort in Prussian prov. of Saxony, on the Saale, 20 m. E.N.E. of Weimar. On a neighbouring hill the German students erected (1896) a triple monument to commemorate the war of 1870-1, Prince Bismarck, and the Emperor William I. Pop. (1900) 2,901.

Kosher, a term in use among the Jews, signifying that an article is clean and lawful, and conforms to the ordinances of the Talmud in its preparation.

Kosi, munic. tn., Muttra dist., United Provinces, India, 40 m. N. of Bhaatpur. Pop. (1901) 9,565.

Köslin, tn., Prussian prov. Pomerania, 5 m. from the Baltic and 105 m. by rail N.E. of Stettin; has sawmills, brick works, iron foundries, and breweries. Pop. (1900) 20,417.

Kossovo, vilayet of European Turkey, bounded on N. by Bulgaria and Servia; cap. Usküb. Area, 12,100 sq. m., and pop. 931,000, principally Slavs. On the plain of Kossovo ('Field of the Blackbirds') the Sultan Murad I. destroyed the Servian empire by defeating and killing the Servian king Lazar in 1389. Sultan Amurath (Murad) II. gained here a great victory over John Hunyady (October 1448).

Kossuth, LAJOS (1802-94), Hungarian patriot and statesman, was born at Monok, co. Zemplin. For publishing reports of the debates of the National Assembly he was sentenced for treason for four years, during which he studied English. On his release (1840) he edited the *Pesti Hírlap*, the organ of the national party (1841). Ceasing to be editor (1844), he devoted himself to agitation, and was elected member for Budapest (1847). After the French revolution of 1848, he demanded, as leader of the Liberals, independence for Hungary, and became minister of finance in the Hungarian ministry formed under Batthyany, issuing the famous *Kossuth Notes*. To meet the revolt of the Croats he demanded 200,000 men and 42

million florins, which were granted with enthusiasm. Challenging Austria for her complicity, he proclaimed the independence of his country, and virtually making himself dictator, carried on the war with immense energy and spirit. After Görgei's surrender at Villagos (1849), Kossuth fled to Turkey, and afterwards visited England (1852-62) and the United States. Finally he settled (1862) in Turin, where he died. He was buried at Pest. See *Memories of my Exile* (1880), by himself; *Hungary and its Revolutions, with a Memoir of Louis Kossuth*, by E. O. S. (1854).

Köstendil. See KÜSTENDIL.

Kostomarov, NICOLAS (1817-85), Russian historian, was born at Ostrogosz in Voronej; issued works (drama, poems) in the Little Russian dialect, until prohibited by government; then wrote on the history of the Ukraine, dealing chiefly with the wars of Bogdan Chmelnicki (4th ed. 1884), and embracing *Historic Monographs* (12 vols. 1863-72); and finally turned to general Russian history, in which field his principal books are *History of the Old Slav Republics Novgorod and Pskov* (1863), and *Russian History in Biographies* (1873 ff.).

Kostroma. (1.) Government, Central Russia, with an area of 32,490 sq. m., and population (1897) of 1,429,228. The land is generally flat, with numerous swamps to the N. and sandy stretches to the S. Much of the area is forest land. The Volga traverses the province in a S.E. direction. Fisheries are important. Flax-culture is rapidly extending. Among the industrial establishments the most important are cotton, leather, and cloth factories, chemical and dye works, tanneries and distilleries. (2.) Capital of above gov., lies at the junction of the Volga and Kostroma, 230 m. N.E. of Moscow. There is an upper town or *kremł*, in which stand the official buildings and the cathedral; the lower town runs down to the bank of the Volga. Outside the walls is a Tartar suburb with a mosque. The most famous building is the Ipatskoi monastery (1330); the cathedral is among the most picturesque in Russia. The chief industries are flax-spinning, candle, wax, and cloth manufacture, tanning, brick-making, distilling, the preparation of tobacco and cement. Kostroma is an important Volga port. Pop. (1897) 41,268. (3.) River, Central Russia, trib. of Volga, into which it falls above Kostroma city. Its general direction is from N.E. to S.W., and its length is nearly 200 m., of which about half is navigable all the year. Area of basin, nearly 8,000 sq. m.

Kőszeg (Ger. *Güns*), tn., Hungary, Vas co., 11 m. by rail N. by W. of Szombathely (Steinamanger); famous for its resistance to the Turks in 1532. Pop. (1900) 7,422.

Kotah, tn., cap. of feudatory state of same name, Rajputana, India, on r. bk. of Chambal, and 120 m. S. of Jaipur. The town contains a handsome new palace, and there are a high school and a school for the sons of nobles. The public library is the Crosthwaite Institute. Pop. of tn. (1901), 33,657. The state has an area of 5,700 sq. m., and a population (1901) of 544,879.

Kotayam, or KOTTAYAM, tn. in feudatory state of Travancore, Madras Presidency, India, 32 m. S.E. of Cochin. It is the headquarters of the Syrian Christian Church in India. Pop. (1901) 17,552.

Kotelnoi. See NEW SIBERIA ISLANDS.

Köthen, or CÖTHEN, tn., Germany, duchy of Anhalt, 31 m. by rail S.E. of Magdeburg; was the capital of duchy of Anhalt-Köthen from 1603 to 1847. Hahnemann founded here (1820) a homeopathic academy. Manufactures sugar and chemicals. Pop. (1900) 22,091.

Kotliarevski, IVAN PETROVITCH (1769-1838), Little Russian poet, born at Poltava; was a civil servant, and afterwards fought in Turkey. The principal work of his life was to put the language of 'Little Russia' on a literary footing, and this he did by publishing a clever travesty of Virgil's *Æneid* (1798). He also wrote for the stage *Natalka Poltavka* (Nathalie of Poltava) (1819), and *Moskal Czarivnyk* (The Soldier as Magician) (new ed. 1862).

Kottbus, or COTTBUS, tn., Prussian prov. Brandenburg, 71 m. by rail S.E. of Berlin, with manufactures of cloth, woollens, linens, carpets, hats, and jute, brewing, iron-founding, tanning, and distilling. Pop. (1900) 39,322.

Kotze, JOHN GILBERT (1850), son of Johannes Kotze of Cape Town, was called to the English bar in 1874, and in 1881 was appointed lord chief-justice of the Transvaal, but was deposed for refusing to recognize the right of the Volksraad to modify the constitution by a simple resolution. He has edited Van Leeuwen's *Commentaries on Roman Dutch Law*.

Kotzebue, AUGUST FRIEDRICH FERDINAND VON (1761-1819), German dramatist, a native of Weimar; spent his life partly in high administrative offices in Russia and partly in Germany, being for causes unknown banished to Siberia (1800), but soon pardoned. At the same time, he became known as the writer of successful dramas—e.g. *The Stranger*

(Eng. trans. 1798), *Poverty and Nobleness of Mind* (Eng. trans. 1799), *Pizarro* (1799), *The Force of Calumny* (1799), *Kindred* (1837), *The Patriot Father* (1830), and many others. From 1790 onwards he waged a bitter feud with Goethe and the romantic school. Sent to Germany by the Russian government to watch and report (1817), he made himself so obnoxious by his satire of liberal tendencies, especially of the *burschenschaft* movement, that he was assassinated at Mannheim by a fanatical student named Sand. His *Sämmtliche dramatische Werke* appeared in 1827-9 (44 vols.).

Kotzebue, OTTO VON (1787-1846), German explorer, son of the preceding, born at Reval; accompanied Kruzenstern in his voyage round the world (1803-6), sailed (1815-18) with Chamisso and Eschscholtz to the South Seas, and gave his name to the sound south-east of Bering Strait. In 1821 he published *A Voyage of Discovery into the South Sea and Behring Straits* (Eng. trans. 1821). He made a new voyage in 1823, described in *A New Voyage Round the World in 1823-6* (1830).

Koumiss, or KUMISS, the chief beverage of the nomads of the Russian steppes, is obtained by the fermentation of mares' milk. It resembles kephir.

Kouropatkin. See KUROPATKIN.

Koussou, the name given to the dried panicles of the female flowers of *Brayera anthelmintica*, a tall, handsome Abyssinian tree belonging to the order Rosaceae. It bears large panicles of small greenish-purple flowers which are diocious. Koussou is used in medicine as an anthelmintic for *Tenia solium* and *T. bothriocephalus*. The virtue of the plant has long been known to the natives of Abyssinia.

Kovalevsky, ALEXANDER (1840-1901), Russian embryologist, born near Vitebsk; became professor at Odessa and St. Petersburg. His most famous papers are those on the development of a simple ascidian (1866 and 1871), and of Amphioxus (1867 and 1877), in which he showed the close resemblance which exists between the tailed larva and the vertebrate embryo, and proved the existence of a connection between the ascidians, Amphioxus, and vertebrates. He also did important work on the development of puzzling forms like brachiopods (1874), the worm Sagitta, and Balanoglossus (1866).

Kovalevsky, SOPHIA VASIL'YEVNA (1850-91), better known as Sonja Kovalevsky, Russian mathematician, was born at Moscow; won various great mathe-

matical prizes; in 1884 she was appointed professor at Stockholm. She also wrote good novels—e.g. *Vera Vorontzoff* (Eng. trans. 1895) and *The Sisters Rajeviski* (Eng. trans. 1895). See Anna Leffler's *Sonja Kovalevsky* (1892).

Kovdo, or KOVDA, riv., Archangel gov., in N. Russia, in Kem district. It is the chief stream of Karelia, and though its course is very short (40 m.), its volume is considerable. It enters the Gulf of Kandalax (Kandalaks), in the N.W. angle of the White Sea, by an estuary about 650 feet in width. The lake of Kovdo (Kovdozero) is about 30 by 24 m., and contains a number of islands. It lies nearest to the sea of all the lacustrine deposits which feed the river Kovdo.

Kovel, tn., Volhynia gov., S.W. Russia, 200 m. W.N.W. of Jitomir (Zhitomir). Pop. (1897) 17,304.

Kovno. (1.) Government of N.W. Russia, a part of Lithuania. To the N. and N.W. is Courland (Kurland), to the W. and S.W. E. Prussia. Area, 15,692 sq. m. Pop. (1897) 1,549,444. The surface is mostly flat. All the rivers belong to the Baltic basin, the most important being the Niemen. Lakes (180 sq. m.) and marshes (650 sq. m.) are numerous. Of late, flax, potato, and fruit culture, as well as market-gardening and cattle-rearing, have become much more active. Bee-keeping has somewhat declined; fishery and milk trade have advanced greatly. The chief industrial establishments are flour mills, distilleries, metal and tobacco factories, and breweries. It was at the third partition of Poland, in 1795, that this government fell to Russia. Almost two-thirds of the people are Roman Catholics, more than a tenth Jews; 75 per cent. are Lithuanians. (2.) Capital of above gov., 59 m. N.N.W. of Vilna. Among the chief buildings are the old college of the Jesuits, the ruins of a pagan (Lithuanian) temple, and of a fortified chateau. The chief industries are soap, candle, match, tobacco, and nail manufactories, distilleries and breweries, tanneries and flour mills; there are also iron foundries, potteries, and lace factories. Kovno is an important commercial centre. An annual fair lasts from June 29 to July 12. Jews number fully a third of the population. Kovno suffered much from the rioting and outbreaks which followed the close of the Russo-Japanese war in 1905. Pop. (1897) 73,543.

Kovrov, tn., Vladimir gov., Central Russia, 40 m. by rail N.E. of Vladimir city. It has brick and cotton manufactures, and an important fair each Christmas. Pop. (1897) 14,570.

Koweit, KUWEIT, or GRANE, tn., Asiatic Turkey, at the head of the Persian Gulf, 90 m. S. of Basra; is suggested as the terminus of the Bagdad railway. Pop. (1901) 25,000.

Kowloon, or KAULUN, peninsula, China, opposite Hong-kong. Part of it was ceded to Great Britain in 1861. In 1898 a lease for ninety-nine years was obtained by the British government of about 376 sq. m., including the port of Kowloon, Mirs Bay and Deep Bay, and the islands of Lan-tao. The harbour of Kowloon has been a free port since 1887. Pop. 100,000.

Kowtow, a ceremony of prostration that is performed by mandarins and others before the emperor of China; consists in going down on all fours and touching the ground with the forehead three or sometimes nine times.

Kozlov, tn., Tambov gov., Central Russia, 45 m. W. of Tambov city. The industries include breweries, brickworks, soap, tallow, and candle manufactories, and cloth-weaving. Over 1½ m. from the town is the famous convent of the Trinity, where an important annual fair is held. Pop. (1897) 40,347.

K.P., Knight of St. Patrick.

Kra, ISTHMUS OF, the connecting link between the Malay Peninsula and the continent of Asia, at its narrowest only 10 m. wide, and not more than 100 ft. above sea-level. It has been proposed to cut a ship canal through the isthmus by way of the rivers Pakshan and Chumpong, which would have the effect of shortening the voyage between Calcutta and China by 660 m., and that between Rangoon and Bangkok by 1,300 m.

Krag, THOMAS PETER (1868), Norwegian novelist, born at Kragøer. Principal works: *Eensomme Mennesker* (1893); *Ada Wilde* (1896) and *Ulf Ran* (1897); *Kobberslangen* (1895); *Mulm* (1893); *Hjem* (1900); *Gunvor Kjeld* (1904); and the drama *Kong Aagon* (1894). He excels in describing the influence of the grim, uncanny Norwegian coast scenery on those who live near it, and his work is full of force and dignity.

Krag, VILHELM (1871), Norwegian poet, born at Christiansand, brother of Thomas Krag. The best of his works, which are inspired by a somewhat melancholy pessimism, are the volume of *Digte* (1891); the poems *Nat* (1892) and *Sange fra Syden* (1893); the romances *Hjemme* (1895) and *Den Glade Løitnant* (1896); and the dramas *Vester i Blaaftædet* (1893), *De Gamles Julaften* (1894), *Isaac Seehuusen* (1900), and *Isaac Kapergast* (1902).

Kragerö, tn., Norwegian co. Bratsberg, on a creek of the Skager Rak; has trade in timber and ice. Pop. (1900) 5,223.

Kragujevac, tn., Servia, 59 m. s.s.e. of Belgrade, with an arsenal. Pop. 14,160.

Krain. See CARNIOLA.

Krakatoa, or KRAKATUA, volcanic isl. (area, 6 sq. m.), Sunda Strait, between Sumatra and Java, E. Indies; was the scene of a series of volcanic discharges in May to August 1883, the most tremendous eruption known to history. A cubic mile of rock material was hurled into the air, and the explosions were heard 150 miles away. Violent atmospheric disturbances and gigantic sea-waves, the latter causing great loss of life, estimated at more than 30,000 persons, resulted; and the ascending dust, caught in the upper air currents and carried twice all round the earth, gave rise to a succession of widely-distributed brilliant sunsets in the following winter and spring. As a result of the explosion, the north part of the island, including its highest peak, altogether disappeared.

Krakau, or KRAKOW, Austria. See CRAWOW.

Kraken, a fabulous monster of the northern seas, first described by Pontoppidan (1750) in *History of Norway*. It resembles an island, plunges suddenly into the depths, and can drag down ships.

Kramskoi, IVAN (1857-87), Russian painter, the leader of the thirteen artists who, disgusted with its officialism over competitions, left the Russian Academy in a body and founded 'The Society for Wandering Exhibitions' (1870), now the centre of the young Russian school, that has emancipated itself from all aims alien, didactic, or eclectic. By his forcible realism, his eagerness and sincerity, he is the quickening influence of the new movement.

Krapf, JOHANN LUDWIG (1810-81), German African missionary and traveller, born near Tübingen; joined the London Church Missionary Society, and went to Shoa (1839), to Mombasa (1843), where he translated the New Testament into Swahili, and to the Wanika (1846). He discovered Mount Kenia, visited Usambara and Ukumbani, and was twice in Abyssinia (1854 and 1867). He compiled a *Vocabulary of Six East African Languages* (1850), and a *Dictionary of the Swahili Language* (1882), and wrote *Reise in Ostafrika in den Jahren 1837-55* (1858; Eng. trans. 1860). See *Missionary Career of Dr. Krapf*, by the Church Missionary Society.

Krasnistaw, or KRASNOSTAV, tn., Lublin gov., Russian Poland, 30 m. s.e. of Lublin city. Pop. (1897) 8,879.

Krasnoe Selo, vil., St. Petersburg gov., N.W. Russia, 16 m. s.s.w. of St. Petersburg city. It has manufactures of earthenware and calico. Here stands an imperial residence. Krasnoe Selo is also one of the chief military camps of Russia. Pop. 2,500.

Krasnovodsk, fortress, Asiatic Russia, on E. of Caspian Sea; is the starting-point of the Transcaspiian Ry. Pop. (1897) 6,329.

Krasnoyarsk, chief tn., Yenisei gov., Siberia, on the Yenisei, 560 m. N.W. of Lake Baikal. It is the residence of the bishop of Yeniseisk and Krasnoyarsk. A fort, the Krasni Yar, was erected here by Cossacks in 1628. Pop. (1897) 27,300.

Kraszewski, JOZEF IGNACY (1812-87), Polish author, born at Warsaw; edited (1841-52) the *Atheneum* at Vilna. He became editor of the *Gazeta Codzienna* (1860), but in 1863 settled at Dresden. In 1884 he was sentenced to seven years' imprisonment for high treason, but was liberated in 1886. It is upon his novels that his reputation chiefly rests. These include *Poeta i Swiat*—The Poet and the World (1839); *Ułana* (1843); *Morturi* (1874-5); *Resurrecturi* (1876). He also wrote poems, dramas, and numerous historical, literary, and artistic studies. His novels appeared at Lemberg in 102 vols. (1871-5). See Bohdanowicz's *J. I. von Kraszewski* (1879).

Krause, KARL CHRISTIAN FRIEDRICH (1781-1832), German philosopher, born at Eisenberg; was a philosophical contemporary of Schelling and Hegel, and a pupil of the former. He was a voluminous writer on philosophical subjects, and for some time a lecturer in the Universities of Jena (1802-5) and Göttingen (1814-31). The doctrine with which his name is mainly associated, his Pantheism, is an attempt to mediate between pantheism and theism. See *Life*, in German, by Martin (1881).

Krazinski, ZYGMUNT, COUNT (1812-59), Polish poet, born at Paris. A meeting with Mickiewicz at Geneva (1830) proved the seed of his poetical inspiration. He lived chiefly at Rome, and ranks high among modern poets of his nation. One of his most striking works is the dramatic poem *Nieboska Komedya*—The Undivine Comedy (1843); but his masterpiece is *Irydion* (1836), a poem on the Roman decadence. His works were published at Lemberg (1880-8).

Kreasote. See CREOSOTE.

Kreatine. See CREATIN.

Krefeld, or CREFELD, tn., Prussian prov. Rhineland, 34 m. by rail N.W. of Cologne; the chief centre in Germany for the manufacture of velvets and silks.

There are also railway repairing shops, engineering works, iron foundries, manufactures of sugar and chemicals, and breweries. The foundations of its present prosperity were laid in the 16th and 17th centuries by refugee Mennonites and Protestants. Here in 1758 the allies under Ferdinand of Brunswick defeated the French. Pop. (1900) 106,893.

Kremenchug, or KREMENTCHUG, tn., Poltava gov., S.W. Russia, 70 m. s.w. of Poltava city. It is one of the principal commercial centres of Little Russia, and one of the chief river ports on the Dnieper. Carriage-building, soap, hat, and agricultural instrument making, sugar-refining, tanning, sawmilling, tobacco and saltpetre manufacture, are largely carried on. Its liqueurs and preserved fruits are also famous; and of late the smelting of iron ore has become important. Pop. (1897) 58,648.

Kremenets (Pol. *Krzemieniec*), tn., Volhynia gov., S.W. Russia, 130 m. w. of Jitomir (Zhitomir). Among the industries are piano, carriage, and mathematical instrument factories, and goldsmiths' and silversmiths' work. Pop. (1897) 17,618.

Kremlin. See MOSCOW.

Krems, tn., Austria, prov. Lower Austria, on l. bk. of Danube, 40 m. n.w. of Vienna, manufactures wine, leather, white lead, and grows fruit. Steel, mustard, and vinegar are also made. Pop. (1900) 12,637.

Kremsier, tn., Moravia, Austria, on the March, 28 m. by rail s. by E. of Olmütz. Its principal edifice is the summer palace of the prince-archbishop of Olmütz. There is some malting, brewing, and manufacture of sugar. The Constitutional Diet of Austria met here from November 1843 to March 1849. Pop. (1900) 13,991.

Kreutzer, RODOLPHE (1766-1831), French musician and violinist, born at Versailles. An exponent of the Italian school, he was (1790) first violin at the Italian theatre in Paris, and in 1817 *chef d'orchestre* at the Paris opera. He himself composed several operas, and Beethoven's *Kreutzer Sonata* was dedicated to him.

Kreuzburg, tn., Prussian Silesia, 59 m. by rail E.S.E. of Breslau. Birthplace of Gustav Freytag (1816-95). The town has milling, iron-founding, brewing, and distilling industries. Pop. (1900) 10,230.

Kreuzer, former Austrian copper coin (100 kr. = 1 gulden), so called from the cross formerly stamped upon it, had a value of one-fifth of an English penny. Until the foundation of the

German Empire (1870), kreuzers were current in S. Germany, but the German kreuzer was worth about one-third of an English penny.

Kreuznach, tn. and wat.-pl., Prussian prov. of Rhineland, on the Nahe, 28 m. by rail s.w. of Mainz, with saline waters and baths. The town is the ancient *Cruciniacum*, and several Roman remains have been discovered in the neighbourhood. Pop. (1900) 21,321.

Kreuz Zeitung, or NEUE PREUSSISCHE ZEITUNG, a German newspaper founded in 1848, is the organ of the ultra-Conservative party in Prussia. Later it has been the principal organ of the Agrarian or Junker party in Prussia. It has a morning and an evening edition.

Kriegspiel, or THE WAR GAME, invented by a Prussian officer in 1824, is intended to afford a representation of military manoeuvres. It is played on contoured maps of a sufficiently large scale to show the main features of the ground, and enable the effect of fire and cover from view to be estimated. The opposing troops are indicated by metal blocks, coloured red and blue, which are made to scale to represent the front of half-battalions, squadrons, and batteries. The size of smaller bodies, such as companies, patrols, and vedettes, is somewhat exaggerated. The game may be played with a minimum number of three persons, one to act as umpire and the other two to command the opposing forces. For every game a scheme must be drawn up which should contain a 'general idea' on which the operations as a whole are based, and a 'special idea,' which will be obviously different for each side. After receiving the scheme, each commander should forward to the umpire a short memorandum giving his view of the operation to be undertaken, and stating in general terms the mode in which he proposes to carry it out. At the same time he should forward his orders for the day of action. These should be precisely similar, both in form and substance, to those which would be issued in the field, and the players must as a rule be held strictly to them. The framing of orders is perhaps the most valuable training to be derived from war games. After these preliminaries have been carried out, three maps are provided, either in adjoining rooms or separated from one another by screens. At the commencement of the game metal blocks representing the forces on either side will be arranged on their respective maps by the umpire, in ac-

cordance with the disposition and orders of the commanders, and on the central or umpire's map the forces of both sides will be similarly arranged. Where this arrangement is impracticable, the game can be carried out on two or even on one map, by using small screens to prevent either commander from seeing more of the movements of his opponent than service conditions would permit. The successful conduct of the game depends principally on the umpire, who gives notice of the commencement of each move, and regulates its length. The time taken in deciding upon and issuing orders should be deducted from the length of time allowed for the corresponding move. At the beginning of a game, when the contending forces are a long way apart, it may be possible to allow troops to be moved for an (imaginary) hour, but when they come to close quarters it may become necessary to limit a move to a few minutes. The game is generally brought to a conclusion when one side has obtained a decisive advantage over the other, or when the bulk of the forces on both sides are in such close contact as to render a decision of the result a matter of too great difficulty. The questions of losses, possibility of movement, and effect of fire are left to the decision of the umpire.

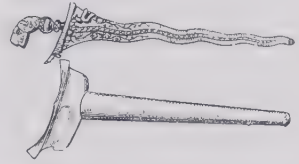
Kriemhild, the heroine of the *Nibelungen Lied*, was sister of Gunther, king of Worms, and wife of Siegfried, possessor of the Nibelungen hoard. Gunther married Brunhild, at whose suggestion Siegfried was murdered by Gunther's vassal, Hagen, who threw the hoard into the Rhine. Kriemhild afterwards married Etzel (Attila), king of the Huns, and when Gunther and Hagen visited her they were put to death.

Kriloff, IVAN ANDREEVITCH (1768-1844), Russian fabulist, born at Moscow. He was for some time secretary to the governor of Livonia, and held an appointment in the Imperial library at St. Petersburg (1812-41). His *Fables* appeared in 1809; Eng. trans. by W. R. S. Ralston (4th ed. 1883).

Krimmitschau, or CRIMMITSCHAU, tn., kingdom of Saxony, near w. frontier, 39 m. by rail s. of Leipzig, the seat of cloth (buckskin) manufacture on a large scale, with wool-spinning, dyeing and stamping, and iron works. Pop. (1900) 22,845.

Kris, or CRESE, a dagger worn in Java and the Malay Peninsula by almost every male above fourteen, and sometimes by women. The blade is usually wavy, though sometimes straight, while the

handle and scabbard are much ornamented.



Kris and Sheath.

Krishna, Hindu god, was the eighth incarnation of Vishnu. The circumstances of his birth and early life are set forth in two modern supplements to the *Mahābhārata*, called the *Harivansa-pairan* and the *Bhagavatapurānas*. In the Krishna of the *Bhagavad-Gita* is represented a great spiritual teacher; but in the popular legend of his dalliance with the Gopis (wives and daughters of cowherds), and in the indecencies of his worship as *Vallabhacharya* we have modern Hinduism in its most depraved form. See Farquhar in *East and West* (Sept. 1904) and Keane in *Hibbert Journal* (July 1905), where the Krishna myth is for the first time cleared up.

Krishna. See KISTNA.

Krishnagar, munic. tn., Nadia dist., Bengal, 55 m. N. of Calcutta. Pop. (1901) 24,547.

Kristiansund, or CHRISTIANSUND, seap. tn., Romsdal co., Norway, 85 m. w.s.w. of Trondhjem; lies on three islands only protected against the sea on the w. It was so named in honour of Christian VI., who gave it its civic privileges in 1742. The main export is fish. There is a thriving coast trade, and the town boasts its own fleet. Pop. (1900) 12,043.

Kristianstad, or CHRISTIANSTAD, cap. of co. of same name in Sweden, prettily situated about 14 m. from the Baltic, on the peninsula Allon in river Helgra. The town has some industries (iron foundries, machinery, manufacturing, breweries, distilleries, tanneries, etc.) and a lively trade in spirits and agricultural produce. A garrison is stationed in the place, which is the seat of the chief tribunal for Scania and Bleking. The chief building is the Trinity Church, of the time of Christian IV., built in the Renaissance style. The town was founded by Christian IV. in 1614, was ceded to Sweden (1658), and suffered many sieges in the Swedish-Danish wars. Pop. (1900) 10,318.

Kristo Das Pal (1838-84), Indian publicist, born at Calcutta; became assistant-secretary of the British Indian Association (1855), and later (1861) editor of the *Hindu Patriot*. He

was a member of the Bengal Legislative Council (1872), and of the viceroy's Council (1883).

Krolevets, tn., Chernigov gov., S.W. Russia, 100 m. E. of Chernigov city; has beet-sugar, earthenware, and brick manufactures. Pop. (1897) 10,375.

Kronenberg, tn., Prussian prov. of Rhineland, 7 m. by rail S.W. of Elberfeld, with iron and steel industries. Pop. (1900) 10,210.

Krones. See CRONOS.

Kronprinz Wilhelm, a mail steamer of the Nord-Deutscher Lloyd, built in 1901. She is of 15,000 tons register, and 35,000 H.P., with a speed of 23 knots.

Kronstadt, or CRONSTADT. (1.) Town, fortress, naval arsenal, and port in St. Petersburg gov., S.W. Russia, on the E. end of Kotlin island, at the head of the Gulf of Finland, less than 18 m. W. of St. Petersburg city, which it protects by sea. To the S. of the town and harbours is the fort of Kronslot. Since the construction of the new maritime canal uniting Kronstadt with St. Petersburg, the largest vessels are able to go up to the quays of the capital. Apart from fortifications, and naval works, arsenals, barracks, cannon foundries, and shipyards, Kronstadt has schools of naval instruction, a marine hospital, cathedral, and summer garden, originally planted by Peter the Great, and properly attached to a small palace in which he lived. Kronstadt was founded by Peter I. in 1710, and has ever since been the principal naval arsenal of Russia in the Baltic. It was the scene of strikes and of conflicts between the military and mutinous sailors during the Russian crisis of 1905. Pop. (1897) 59,539. (2.) (Hung. *Brassó*), royal free tn., picturesquely situated at foot of the Transylvanian Alps, Hungary, 70 m. S.E. of Hermannstadt; is strongly fortified. Its Gothic Protestant cathedral dates from 1335. It has manufactures of cloth, leather, cement, and candles, also petroleum refineries. In the 16th century it became the centre of Protestantism. Pop. (1900) 34,511.

Kroomen, KRU, or CROO, properly Crao, tribe of negroes inhabiting the coasts of Liberia and French Guinea, W. Africa. They are among the most active of negro races, and are skilful sailors and boat-builders. They are the best labourers in all W. Africa.

Kroonstadt, dist. and tn. in N. of Orange River Colony, Brit. S. Africa. The former is bounded by the Vaal R. on the N. The town is 96 m. S.S.W. of Johannesburg. Pop. (1904) 5,797; of dist. 19,255.

Kropotkin, PRINCE ALEXEIEVITCH, PRINCE (1842), Russian geographer and nihilist, was born in Moscow, and became secretary to the Physical Geography Section of the Geographical Society. In 1871, at the request of the Geographical Society, he set out to explore the glaciers of Finland and Sweden. The following year, in Belgium and Switzerland, he came under the influence of socialistic and anarchist teachings. He attached himself to the International Working Men's Association, and became one of its most enthusiastic members. On his return to Russia he held secret conferences among the workmen of St. Petersburg. He was betrayed to the authorities, was arrested, and confined first in the fortress of St. Peter and St. Paul, and later in the military hospital of St. Petersburg, whence he escaped in 1876 to England. He proceeded in the following year to Geneva, where he became the head and front of the socialistic and nihilistic agitation, and founded its organ, *La Révolté*. Banished from Switzerland in 1881, Prince Kropotkin was next (1883) arrested at Lyons on a charge of anarchist incitements, and condemned to five years' imprisonment, but was pardoned in January 1886, and conducted to the frontier. He once more sought asylum in England, where he has lived since. His publications include *Researches on the Glacial Period* (1876), *Paroles d'un révolté* (1885), *In Russian and French Prisons* (1887), and *Memoirs of a Revolutionist* (1899), *L'Anarchie* (1896; Eng. trans. 1897); *Fields, Factories, and Workshops* (1899; 5th ed. 1904); *The Orography of Asia* (1904); *The Devication of Asia* (1904); and *Ideals and Realities in Russian Literature* (1905).

Krossen, tn., Brandenburg, Prussia, at the confluence of the Oder and Bober, 31 m. S.E. of Frankfort-on-Oder, has manufactures of woollen cloth and hosiery. It has an old citadel. Pop. (1900) 7,369.

Krotón, Italy. See COTRONE.

Krotoschin, tn., Prussian prov. Posen, 60 m. by rail N.N.E. of Breslau, with a seat of the Prince of Thurn and Taxis. Here are brickworks, breweries, etc. Pop. (1900) 12,373.

Krüdener, BARBARA JULIANA VON (1766-1824), Russian mystic, born at Riga. Adopting the views of the Pietists, she devoted herself to preaching and prophesying. She had great influence with Czar Alexander I., and claimed to have suggested to him the plan of the Holy Alliance. She wrote a romance entitled *Valeria* (1803). See Ford's *Life and Letters of Madame Krüdener* (1893).

Kruger, STEPHANUS JOHANNES PAULUS (1825-1904), four times president of the South African Republic (1883, 1888, 1893, 1898), was born at Colesburg in Cape Colony, but his father joined in the great trek of 1836, and with his family settled in the Magaliesburg. In 1852 he accompanied Pretorius to the Sand R., where the Sand River Convention was concluded. A year later he figured as second in command of Pretorius's commando in an expedition organized to avenge the murder of Hermann Potgieter by the Kaffirs. In 1857 he was associated with Pretorius in what is known as the Potchefstroom revolt against the dominance of Lydenburg. A raid was made by Pretorius and Kruger into the Orange River Free State, in connection with this movement, in circumstances somewhat resembling those of the subsequent Jameson raid into the Transvaal (1895), and with a like ineffective result. Kruger was actively concerned in the civil war (1861-4), on what was called the 'Government' side, and it was largely on his initiative that the negotiations were entered upon which brought the strife to an end, and led to the foundation of the united republic, of which he was elected first commandant-general. The 'Dopper' party, who declared that they had had enough of progress under President Burgers, nominated Kruger as their candidate for the presidency. After the annexation of the Transvaal by Sir T. Shepstone, Kruger was one of the deputation chosen to proceed to England to present a formal protest. For some time after his return to the Transvaal, Kruger accepted the pay of the British government, but on his appointment expiring in November 1877, the government refused to reappoint him. This turned him into an irreconcilable. At length the republic was formally proclaimed at Paardekraal, near Krugersdorp, in December 1880, under a triumvirate consisting of Kruger, Joubert and Pretorius. In 1883 Kruger was elected president, and with General Smut proceeded to England and negotiated the London convention of 1884, which modified that of 1881. By his refusal of the reasonable franchise to the Outlanders, he provoked the Jameson Raid. The raid did more than anything else to focus attention on the internal affairs of the Transvaal, and negotiations were entered upon between Mr. Chamberlain, on behalf of the British government, and Mr. Kruger, which only ended in the Boer 'ultimatum' of Oct. 11, 1899. (See SOUTH AFRICAN WAR.) Mr. Kruger sailed from Lorenzo Marques for Europe on Oct. 19,

1900, where he resided till his death. His body was afterwards conveyed back to Pretoria and buried there. He published his *Memoirs* in November 1902.

Krugersdorp, dist. and tn. in Transvaal Colony, British S. Africa. The town is 21 m. from Johannesburg. Here the Dutch used to celebrate annually, on

Budweis, with manufacture of linen, hemp, and paper, and graphite-mining. Pop. (1900) 8,673.

Krummacher, **FRIEDRICH WILHELM** (1796-1868), German preacher and religious writer, was born at Mörs on the Rhine; was assistant in the Reformed congregation at Frankfurt (1819-23), pastor at Ruhrort (1823-5), and

(1835); *Das Passionsbuch* (*Suffering Saviour*, 1870); *David* (1867; trans. 1870). See his *Autobiography* (trans. 1871).

Krupp, **ALFRED** (1812-87), iron and steel manufacturer, head of the works at Essen in Prussia, was a native of that town. For many years the main efforts of the Krupps were to cast large blocks of steel; and the profits obtained from the invention of the spoon roller, cast-steel axles, and solid forged railway tyres, were devoted to this object. In 1847 Krupp manufactured the first cannon made of cast steel, a 3-pounder, and in the Exhibition of 1851 he showed a 6-pounder steel gun. When the Bessemer process of steel manufacture came into operation in England (1857), with the simultaneous use of the steam hammer, Krupp saw their advantages, and at once adopted both inventions. In 1880 he forged a steel breech-loading gun of 100 tons weight, till then the largest ever cast. The Krupp works are also noted for the manufacture of side-armour for warships. Krupp introduced the process of carburizing the impact face, thus giving the surface a glass-hardness, which shatters the projectile, the plate neither cracking nor flaking. In 1902 the Krupp works at Essen, Annen, Kiel, and Gruson at Magdeburg employed 43,100 persons, 24,000 of these being in and around Essen. Alfred Krupp was succeeded by his only son **FRIEDRICH ALFRED KRUPP** (1854-1902), who constructed the 105-ton gun for the defence of Cronstadt, and established the Germania Ship-building Yard at Kiel. See article, with portraits, 'The Founders of the Krupp Establishment,' in *The Engineering Magazine*, vol. xx., pp. 519-530.

Krusenstern, **ADAM JOHN** (1770-1846), Russian navigator and traveller, was born at Haggud in Esthonia. In 1803 he was entrusted by Alexander I. with the command of a scientific and commercial expedition to the N. Pacific coasts of America and Asia, during which he discovered the Orloff Is., examined and took soundings around the Washington and Marquesas groups, and was the first Russian to circumnavigate the world. In 1810 he published his *Voyage round the World* (Eng. trans. 1813). He was also the author of numerous works on hydrography, including an *Atlas of the Pacific Ocean*. See *Memoir* by Bernhardt (trans. by Sir John Ross, 1856).

Krusevac, tn., Servia, on the Morava, 27 m. S.E. by s. of Kragujevac. Until 1389 it was the capital of Servia, and still contains ruins of the ancient palace. Pop. 7,000.



President Kruger: the official Portrait which hung in the Raadzaal, Pretoria.

(Photo by N. P. Edwards.)

Dec. 15, their victory over Dingaan (1836), and also their triumph over the British forces at Majuba Hill (1881). Near here (Doornkop) Dr. Jameson surrendered to the Boers on Jan. 2, 1896. Krugersdorp is a mining centre. Pop. (1904) 12,118.

Krumau, or **KRUMMAU**, tn., Bohemia, Austria, on l. bk. of Moldau, 19 m. by rail S.S.W. of

was translated successively to Barmen (1825), Elberfeld (1834), Trinity Church, Berlin (1847), eventually becoming court chaplain at Potsdam (1853). He was eloquent, imaginative, and thoroughly versed in Scripture. His best-known works are *Salomo und Sulamith* (sermons on Canticles—trans. 1838); *Elias der Tishbiter* (1828; trans. 1838, etc.); *Elisha*

Krushevo, tn., Turkish vilayet of Monastir, 23 m. N. by w. of Monastir. Pop. 10,000.

Krypton, Kr, 81'8, is a gaseous element existing in the atmosphere. It was discovered spectroscopically by Sir William Ramsay, and is a colourless gas that liquefies at -152°C. , has a density of 41, is marked by a brilliant green and yellow line in its spectrum, and is chemically inactive.

Kshatriyas. See CASTE.

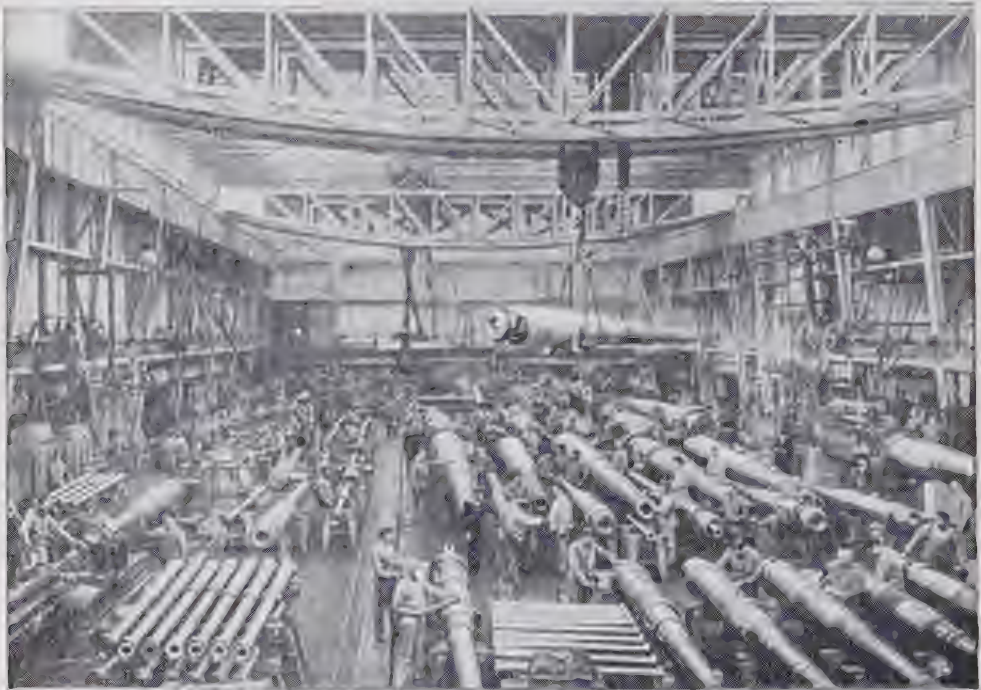
K.T., Knight of the Thistle.

Kuala Lumpur, cap. of British protected state of Selangor, in the Malay Peninsula, and chief

Kuban. (1.) Russian prov., Caucasus, includes the valley of the Kuban and the N. slope of the Caucasus range as far E. as Elbruz, and the plains of the lower Kuban and the coast of the Sea of Azov. Agriculture is almost entirely in the hands of Cossacks and German colonists. The mountaineers (Karachai, etc.) and the nomads of the plains are a pastoral people, and rear horses. Petroleum, coal, and salt are obtained. Area, 36,438 sq. m. Pop. (1897) 1,922,773. (2.) (Anc. *Hypanis* and *Vardan*), riv., 450 m. long, rises in Mount Elbruz,

Kubelik, JAN (1880), Bohemian violinist, born at Michle, near Prague; began to give recitals in 1898; in 1900 made his début in London, and in 1901-2 toured in the United States. Possessing phenomenal technical powers, he excels in the rendering of works of virtuosity. In 1903 he married the widow of Count Czaky.

Kublai Khan (1216-94), founder of the Mongol dynasty of China, was a grandson of Jenghiz Khan. While his brother Mangū occupied the Mongol throne, Kublai completed the conquest of N. China, or Cathay, commenced



Gun Factory at the Krupp Works, Essen.

(Photo by F. Krupp, A.G., Essen.)

centre of the tin-mining industry. Pop. (1901) 77,234.

Kuala Selangor, seapt. at mouth of Selangor, in British protectorate of Selangor, in the Malay Peninsula. Next to Malacca it was the most important stronghold of the Dutch in the Malay Peninsula. The chief exports are tin, gutta-percha, timber, ivory, hides, salt fish, and rattans. Pop. 31,000.

Kuanzo. See CONGO.

Kuanza. See COANZA.

Kuba, tn., Baku gov., Russian Transcaucasia, 95 m. N.W. of Baku; has a trade in silk, fruit, and rugs. Pop. (1897) 15,346.

drains an area of 21,000 sq. m. in N.W. Caucasus, and enters the Black Sea S. of Taman peninsula, and sends one arm N. to the Sea of Azov after a fall of 8,580 ft. The bed is sinuous, and encumbered with sandbanks. In the lower course the water is extensively used for irrigation.

Kubango, or OKAVANGO, riv., S. Africa, rising in Portuguese W. Africa, about 13° S. and 16° E., flows generally S.E. and enters the marshy tracts N. of Lake Ngami. During the rainy season its waters are said to flow in part to the Zambezi and in part to Lake Ngami.

by his grandfather, and on Mangū's death (1259) he became 'the Great Khan.' He subsequently made himself master of the southern provinces of China (1276), and an empire of vast extent, including Tartary, Tibet, Burma, and other countries. Japan, however, defied all his efforts at conquest. Kublai was an able and enlightened monarch, encouraging literature, establishing Buddhism as the state religion, but delighting in Oriental magnificence, which Marco Polo has described in vivid language.

Kuchan, or KABUSHAN, tn., Khorassan, Persia, 88 m. N.W. of

Meshed. Here severe earthquakes took place in November 1893 and January 1895. Pop. 12,000.

Kuch Behar, feudatory state, Bengal, India, near the Himalayas. It contains the ruins of two ancient capitals of the Kamrup Hindu dynasty. Area, 1,307 sq. m. Pop. (1901) 566,974. Its capital is Kuch Behar.

Kuching. See SARAWAK.



Head of Kudu.

Kudu, an antelope related to the eland, but differing in that horns are absent in the female, while those of the male are curved in a spiral. The tail is much shorter than in the eland, the neck is maned, and the body is marked by narrow vertical white stripes. The common kudu (*Strepsiceros kudu*) occurs in wooded regions from the Cape to the highlands of Abyssinia. The lesser kudu (*S. imberbis*) is confined to Somaliland and its vicinity.

Kuei-hua-chêng, or KUKU-KHOTO, ta., China, prov. Shan-si, 250 m. N.E. of Peking, trade route from Peking to the w., about 40° 43' N. lat. and 111° 40' E. long.

Kuenen, ABRAHAM (1828-91), Dutch Biblical scholar, was born at Haarlem in Holland. In 1853 he became professor of Old Testament theology at Leyden, where he died. Kuenen will rank as one of the great masters in Old Testament criticism, and to him, almost more than to any other, falls the honour of placing the modern theory of the Pentateuch and of the history of Israel on a proper scientific footing. H. Graf, following certain suggestions of Vatke, had ventured, in his *Geschichtliche Bücher des A.T.* (1866), to draw a distinction of origin and date between the historical and legal portions of the *Grundschrift* (i.e. P.; see article HEXATEUCH); and Kuenen, in his *Godsdienst van Israël* (1869-70; Eng. trans. *The Religion of Israel*, 1874-5), showed the untenableness of the hypothesis, and solved the matter by assigning the whole of the 'priestly' *Grundschrift*, both legal and historical, to a date

much later than the 'prophetic' narrative (JE). In pursuance of the method adopted by Baur in his book on early church history, Kuenen began with the literary prophets of the 8th century B.C. as a fixed historical point, and from this worked his way backwards to the earlier stages. Kuenen's superb learning, his brilliant insight, and his fine quality of reverence are displayed in all his works, the chief of which, besides the *Godsdienst* above mentioned, are *Historisch-kritisch Onderzoek naar het Ontstaan en de Verzameling van de Boeken des Ouden Verbonds* (1861-65; Eng. trans. *The Pentateuch and Joshua critically examined*, by Colenso, 1865; *Historico-Critical Inquiry into the Origin and Composition of the Hexateuch*; German by Schultz, 1886-92); *De Profeten en de Profetie onder Israël* (1875; *Prophets and Prophecy in Israel*, 1877); *Natural Religions and Universal Religions* (Hibbert Lecture, 1882). Kuenen also contributed largely to reviews, especially the *Theologisch Tijdschrift*. See *Jewish Quart. Rev.* (1892), and Kuenen's *Levensbericht*, by W. van der Vlugt (1893).

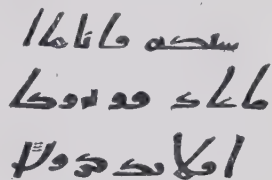
Kuenlun, or KWENLUN, a system of mountains forming one of the loftiest ranges in Asia, and constituting the northern wall of the Tibetan plateau. Its general direction is from w. to e.; its length is about 2,300 m. Like the Andes and Himalayas, the main range is continually dividing into several parallel chains. Most geographers, following Richthofen, divide it into three main parts—Western, Central, and Eastern. (1.) The Western Kuenlun extends from about 76° 20' to 89° 20' E. long., from the Pamir to the Tash-davan pass in the Altin-tagħ section of the range, where the trade route from the Tarim valley to Lhasa crosses the mountains. This point answers roughly to the west end of the Tsaidam upland basin. (2.) The Central Kuenlun reaches from about 89° 20' to 104° E. long., from the Lhasa-Tarim route to the meridian of Lan-chow on the Hwang-ho. It is split into two main chains by Tsaidam. (3.) The Eastern Kuenlun, lying wholly in China proper, stretches from about 104° to 112° 20' E. long. from the meridian of Lan-chow to a little E. of Ho-nan city in Ho-nan.

The Western Kuenlun is superficially separated from the Pamir by the valley of the Yarkand Daria, but really has its root in that great knot of the Asiatic mountain systems. It runs E. under the general name of Astin-tagħ, but is backed towards the

s. by a great number of parallel ranges—e.g. Akato-tagħ, Chimen-tagħ, Kalta-alagan, Arka-tagħ—which rise like steps up to the level of the vast Tibetan plateau. This is the highest section of the Kuenlun, the average elevations in some cases exceeding 20,000 ft., while the passes which cross the more southerly ranges often range between 16,000 and 17,000 ft., and even reach nearly 18,000 ft.

The Central Kuenlun encloses in its wide ramifications the upland basin of Tsaidam, to the w. of Koko-nor, and is continued E. by the Nan-shan ranges. Some of the greatest rivers of Chinese S.E. Asia, especially the Hwang-ho and the Yang-tse-kiang, rise in this part of the Kuenlun.

The system is continued from the Nan-shan chain by the mountains of N.W. China (Ku-liang, Ala-shan, and In-shan), to join the highlands of N.E. Asia in the Greater Khingan range.



Kufic Script, from a Koran of the 8th century.

Kufic, or CUFIC, Arabic letters or characters, which were for Mohammedan coins and inscriptions, containing only sixteen out of the twenty-eight Arabic consonants. These letters, in which the Koran was originally written, are distinguished from the Neskhî or cursive Arabic, introduced in the 10th century, and still in use for ordinary purposes, and are so called from Cufa, a city near Bagdad, famous for expert writers of these epigraphic characters. The Kufic script was in use for coins from the end of the 7th to the 13th century.

Kugler, FRANZ (1808-58), German art historian, was born at Stettin, and appointed professor in the Art Academy at Berlin (1833). He wrote *Handbuch der Geschichte der Malerei* (1837) from the time of Constantine, which became the standard work on the subject, and was translated into English partly by Sir C. and Lady Eastlake (new ed. by A. H. Layard, 1891), and partly by Sir E. Head (new ed. by Sir J. A. Crowe, 1898); also *Geschichte der Baukunst* (1855-60); *Handbuch der Kunstgeschichte* (5th ed. 1872); and *Geschichte Friedrichs des Grossen* (1840; 5th ed. 1901; trans. with Menzels' famous illustrations, 1844).

K'uh-fu, walled city, Shantung, China, 12 m. N.E. of Yen-

chow. About $1\frac{1}{2}$ m. to the N. is the burial-place of Confucius, who was born in the city. A magnificent temple in his honour is visited by numbers of pilgrims. The ducal residence of the descendants of Confucius is situated within the walls. Pop. 25,000.

Kuhn, FRANZ FELIX ADALBERT (1812-81), German mythologist, born at Königsberg in Brandenburg; taught (1841) at the gymnasium of Cologne, of which he became the head (1870). One of the founders of comparative mythology, he published *Zur ältesten Geschichte der indo-germanischen Völker* (2nd ed. 1850); *Die Herabkunft des Feuers und des Göttertranks* (2nd ed. 1886); *Ueber Entwicklungstufen der Mythenbildung* (1874). He also published *Märkische Sagen und Märchen* (1842); *Sagen, Gebräuche, und Märchen aus Westfalen* (1859).

Kühne, WILHELM (1837-1900), German physiologist, born at Hamburg; and after working under Virchow at Berlin, became professor of physiology at Amsterdam (1868) and at Heidelberg (1871). He wrote on the physiology of the muscles and nerves, and on digestion.

Kuilenburg, or CULENBORG, tn., Netherlands, on l. bk. of Lek, 9 m. S.E. of Utrecht; manufactures cigars, chairs, arms, flour, and ribbons. Pop. (1899) 8,280.

Kuka, tn., Bornu, Central Sudan, on w. shore of Lake Chad, the former centre of the slave trade with Tripoli. It was completely destroyed by Rabeh in 1898. Pop. estimated at 60,000.

Ku-klux-klan, a secret association founded in the Southern States of the American Union about 1866, for the purpose of preventing the exercise of political rights by the newly emancipated negroes. The association began by whipping its victims, and afterwards proceeded to murder them; and as the sympathy of the white population was with the association, the state governments were unable to suppress the movement, which was finally, but with difficulty, put down (1871) by the United States.

Kukukhoto. See KUEI-HUA-CHENG.

Kulan, KIANG, or DZIGGETAI, names given to a variety of the Asiatic wild ass (*Equus hemionus*) found in Tibet and Mongolia, and distinguished by its reddish colour, and the narrowness of the dark stripe down the back. See HORSE and ASS.

Kulasekharapatnam, tn. in Tinnevely dist., Madras, India, on coast of Gulf of Manaar, 45 m. N.E. of Cape Comorin. Pop. (1901) 19,898.

Kulbarga, or GULBARGA, chief tn. of Kulbarga dist., Haidarabad State, India, 75 m. N.E. of

Bijapur. It was (1347-1432) the capital of Hindu and Mohammedan dynasties, and has ruins of palaces. The citadel contains the great mosque, modelled after that of Cordoba in Spain. Pop. (1901) 29,228.

Kulja, or ILI, cap. of prov. Kulja or Ili, in Chinese Zungaria, in the valley of the Ili, S.E. of Lake Balkhash. It is walled, and has a citadel. It produces grain, fruits, vegetables, oil, and paper. In the middle ages it was known as Almalig or Almalik. From 1871 to 1881 it was occupied by Russia. Pop. 15,000.

Kulm, tn., Prussia, prov. W. Prussia, on r. bk. of Vistula, 32 m. N.W. of Thorn; with sawmills and machinery works. It gives a title to a bishopric. (See KULMSEE.) Pop. (1900) 11,079.

Kulmbach, tn., Bavaria, prov. Upper Franconia, on White Main, 38 m. by rail N.E. of Bamberg; formerly residence of the margraves of Brandenburg-Kulmbach. It has breweries and malt-kilns. Pop. (1900) 10,591.

Kulmsee, tn., Prussia, prov. W. Prussia, 14 m. by rail N. of Thorn; from 1243 to 1824 the see of the bishops of Kulm. Pop. (1900) 8,987.

Kulp, vil., gov. Erivan, Transcaucasia, Russia, 20 m. S.W. of Erivan, has a famous salt mine.

Kulturkampf, the name applied to the controversy and struggle between the Prussian state and the Church of Rome. The name signifies, according to Virchow, the great antagonist of the clerical party, the struggle for education and enlightenment; but, according to the clericals, the struggle against education and enlightenment. It arose out of the May Laws passed in 1872 by Falk, the minister of public worship, to restrain the activities of the Jesuits and others. A working compromise was eventually arrived at in 1880 and 1882.

Kulu, fertile valley in Kangra dist., Punjab, India, with an area of 1,934 sq. m. Traces of silver, copper, and lead have been found, but its mineral wealth is undeveloped. Good fruit and vegetables find a market at Simla.

Kum, chief tn. of prov. of same name in Irak-Ajemi, Persia, 80 m. S.S.W. of Teheran. It contains the tomb of Fatima, sister of Imam Riza, and is a popular pilgrim resort. Next to Meshed it is considered the most sacred place in Persia. Cotton is largely cultivated. Pop. 20,000.

Kuma, riv., Russia, forming the boundary of the Caucasus prov. on N.E. It rises on the main chain between the Kuban and the Terek, and has a length of 300 m. Much of its water is drawn off for irrigation, and it finally loses itself in the sands of the steppe.

Kumamoto, city, Kiushiu, Japan, 50 m. N.E. of Nagasaki. Its (ruined) castle was built in the 16th century. Outside the town is a much-frequented Buddhist temple. Pop. (1898) 61,463.

Kumania, or CUMANIA. (1.) Former dist. of Europe, N. of Danube and N.W. of Black Sea, including the present Moldavia, Walachia, and S. Russia. The Cumans belonged to the Turkish stock, and invaded Hungary about the 11th century. They were conquered and forced to become Christians in the 14th century. (2.) GREAT K., in Central Hungary, E. of the Theiss. The chief mkt. tn. is Kardaz-Uj-Szallas. Area, 424 sq. m. Pop. 55,000. (3.) LITTLE K., in Central Hungary, between the Danube and the Theiss. Its largest town is Félégháza. Area, 1,000 sq. m.; pop. 64,000.

Kumarila Bhatta, also known as BHATTACHARYA, a Brahmin who lived about 600 A.D. He annotated the *Sutras*, taught the Mimamsa philosophy, and distinguished himself by his interpretation of the Vedic texts. He was a reformer of Brahmanism, and a bitter opponent of the Buddhists, whom he persecuted. He offered himself in voluntary sacrifice.

Kumassi, or COOMASSIE, cap. Ashanti, Gold Coast hinterland, W. Africa, about 6° 30' N., some 180 m. by rail from Sekondi, its port on the Gulf of Guinea. In 1874 it was ruined by a British expedition under Sir Garnet Wolseley. In 1895-6 a second British expedition took the place.

Kumaun, or KUMAON, div., United Provinces, India, consisting of the three districts Naini Tal, Almora, and Garhwal. It lies chiefly on the S. slope of the Himalayas, and consists of mountains and forests (Tarai). Tributaries of the Alaknanda and the Gogra drain it. Tea gardens cover 3,000 ac. Its valuable timber includes *sal*, Himalayan pine, cypress, and fir, and there are mines (imperfectly worked) of iron, copper, and lead. The division contains numerous pilgrim resorts, such as Deoprayag and Vishnuprayag. Seized by the Gurkas at the end of the 18th century, it was annexed by the British in 1815. The inhabitants are Khasias. Cap. Almora. Area, 13,743 sq. m.; pop. (1901) 1,207,030.

Kumis. See KOUMISS.

Kummel, a liqueur imported chiefly from Riga, is produced from bruised caraway seeds, cummin, and other flavouring bodies. Grain alcohol is usually the base of this liqueur. It contains about 34 per cent. of alcohol.

Kumta, chief tn., S. Kanara dist., Bombay, India, 80 m. S.S.W. of Dharwar. Pop. (1901) 10,818.

Kunar, riv. rising on s. of Hindu-Kush. Its longest head-stream takes the name of the Chitral or Kashkar. The Kabul R. joins it below Jelalabad. The Kunar gives its name to a picturesque and fertile valley in the spurs of the Hindu-Kush. On the river stand the ruins of Kunar, once famous for its palaces and pleasure grounds.

Kunch, munic. tn., Jalaun dist., United Provinces, India, 80 m. s.w. of Cawnpur. Pop. (1901) 15,888.

Kundt, AUGUST (1839-94), German physicist, born at Schwerin. After holding professorships at Zürich (1868), Würzburg (1870), and Strassburg (1872), he succeeded (1888) Helmholtz as professor of physics in the Berlin Physical Institute, where he remained till his death. His name is principally connected with the dust figures produced by sound vibrations—an investigation that led to his determination, along with Warburg, of the ratio of the two specific heats of a gas; the method being recently of the utmost value in deciding the nature of the gases helium and argon. His optical work is also of the highest importance, and includes investigations of anomalous dispersion, magneto-optical rotation, and the refractive indices of metals. He wrote *De Lumini Depolarisato* (1864).

Kunene. See CUNENE.

Kunersdorf, vil., Brandenburg, Prussia, 6 m. E. of Frankfurt-on-Oder, where, on Aug. 12, 1759, Frederick the Great of Prussia was defeated by the Russians under Soltikoff and the Austrians under Laudon with tremendous loss.

Kungur, tn., Perm gov., N.E. Russia, 58 m. s.s.e. of Perm city. It has copper and iron mines, and carries on tanning, leather-work, soap and shoe making, iron-founding, locksmiths' work, farriery, and engineering. It has an important fair. Near the town are famous caverns hollowed out of alabaster, which is quarried. Pop. (1897) 14,324.

Kunigunde, ST. (d. c. 1030), canonized by Innocent III.; was the daughter of Siegfried, Count of Luxemburg, and the wife of the Emperor Henry II. After her husband's death (1024) she entered a convent, founded by herself at Kaufungen, near Kassel. Her day is March 3.

Kunszentmarton, tn., Hungary, co. Jasz-Nagykun-Szolnok, on the Körös, 53 m. n. of Szegedin. Pop. (1900) 10,764.

Kunti, one of the heroines of the *Mahābhārata*.

Kuopio, (I.) Province, Central Finland, with an area of 16,500 sq. m., of which 30 per cent. is marshes and 15 per cent. lakes, while less than 3 per cent. is under cultivation. Iron is ob-

tained. Pop. (1897) 305,166. (2.) Town, cap of above prov., 285 m. N.N.E. of Helsingfors. It stands on a peninsula in Lake Kallavesi, and is the terminus of a railway from Kotka and the Gulf of Finland. It has several colleges, a cathedral, and public gardens. Pop. (1897) 9,412.

Kupferschiefer, a black bituminous shale, not over two feet in thickness, which occurs at the base of the Upper or Zechstein group of the Permian rocks of Germany. It contains numerous fossil fishes (e.g. *Palæoniscus*) and remains of plants. It is an important source of copper, being mined near Mansfeld. It is believed that the deposit was laid down in an extensive lake, the waters of which were polluted at intervals by salts of copper and other minerals discharged by some of the numerous volcanoes which were active at that time in the vicinity. These poisoned the fishes inhabiting the lake, and their dead bodies charged the mud with organic matter, which is preserved as bitumen in the shale. See Phillip's *Ore Deposits*, Sir Archibald Geikie's *Geology*.

Kura, or KUR, riv., Russia, the largest of the Caucasus, with a drainage basin of 60,000 sq. m. It rises on N. side of Chaldyr ridge, and enters the Caspian Sea after a course of 700 m., and with an average fall of about nine feet per mile. Below Tiflis it deposits large quantities of silt, and at high water floods the surrounding country. Steamers ply up it as far as Piraza. Sturgeon, salmon, shad, and other fish abound. Its chief tributary is the Aras (anc. Araxes), 540 m. long.

Kurdistan, the mountainous country stretching southwards from the riv. Araxes to the plains of Mesopotamia and the mountains of Luristan, and from the Euphrates E. to Urmia in Persia. The Kurds, probably over two millions in number, are an Iranian people, supposed to be descended from the Medes or the Carduchi; but the admixture of Turkish, Armenian, and Persian blood has produced a variety of types. Generally they are of middle stature, gracefully and powerfully built, with regular features and abundant hair, brown or occasionally black in colour. They are barbarous and cruel, and are notorious for their massacres of Armenians. The Kurds are divided into a large number of small tribes, each governed by a hereditary chief. The majority are Mohammedans of the Sunnite sect. The Yezids, most numerous in the Singar range, are generally regarded as devil-worshippers. Formerly all were nomads. Those who have taken to agricultural pursuits still often

migrate to distant pastures in summer. They keep cattle, goats, and horses, but their chief wealth consists in sheep.

Kurgan, tn., Tobolsk gov., Siberia, on l. bk. of Tobol, 200 m. S.E. of Ekaterinburg, and the first station of the Siberian railway. Pop. (1897) 10,579.

Kurgans are ancient sepulchres and grave mounds found in various parts of European Russia and Siberia.

Kuria-Muria, a group of rocky, barren islets off S.E. coast of Arabia, ceded in 1854 to Britain by the sultan of Muscat. They are now attached to Aden, and are leased for guano collection.

Kuriles (Japanese, *Chishima*), chain of small, volcanic, barren, fog-infested islands, belonging to Japan, and stretching N.E. from the N. of Yezo to the S. of Kamchatka. They cover an area of 6,153 sq. m., the chief islands being Kunashiri, Iturup (formerly Staten), Paramushiri, and Shamsu. The highest summit is Chacha-nobiri (7,900 ft.), in Kunashiri. Tomari, in the same island, is the nearest port to Japan. The inhabitants (Ainus and Kamchadales) are joined by hunters and fishermen during the summer. The northern islands were ceded to Japan by Russia in 1875, in exchange for part of Sakhalin. Pop. (1901) 4,413.

Kurla, munic. tn., Thana dist., Bombay Presidency, India, on Salsette, 8 m. N.E. of Bombay, with which it is connected by a causeway. It has cotton mills. Pop. (1901) 14,831.

Kurland, or COURLAND, Baltic prov. of Russia, between the Gulf of Riga on the N. and the prov. of Kovno on the S. It is 10,535 sq. m. in area, and its surface is mostly level. It has many small scattered lakes, and almost one-third of the surface is covered with forest. Agriculture, cattle-breeding, and sheep-rearing occupy most of the inhabitants. Cotton, iron goods, agricultural implements, leather, and matches are made, chiefly at Libau (chief port) and Mitau (the capital). The inhabitants are chiefly Letts, and mostly Protestants. A possession of the Teutonic knights since the 13th century, Kurland came under Polish rule in 1561, and was finally united to Russia in 1795. Pop. (1897) 672,634.

Kuroki, BARON (1842), Japanese general, distinguished himself in the Chino-Japanese war of 1894. At first he was superintendent of the mobilization, but afterwards took an active part in the field, and was present at the storming of Wei-hai-wei. In the Russo-Japanese campaign (1904), as commander of the First Japanese Army, he won the victory of 1st May at Kiu-lien-cheng, thus iso-

lating Port Arthur; and was one of the generals in command at Mukden. See RUSSO-JAPANESE WAR.

Kuropatkin, ALEXEI NICOLAEVITCH (1848), Russian general, was born in gov. of Pskov. In the war against the Bokharans he distinguished himself. After travelling in France and Algeria, in 1876 he

sian army. From 1890 to 1898 he was governor of Transcaspia, and in the war with Japan (1904) he was made commander-in-chief of the Russian army; but at his own request he was superseded by General Linievitch in March 1905, and was appointed to the command of the First Manchurian army. He is the author of works



Baron Kuroki, the distinguished Japanese General.

went back to Turkestan, to assist Skobelev in the easy conquest of Khokand. In the Russo-Turkish war he became Skobelev's chief of staff, and distinguished himself at Plevna. Under Skobelev he was engaged in the fighting at Gook-Tepe, which was carried by storm. After the death of Skobelev, in 1882, Kuropatkin was engaged in reorganizing the Rus-

sian army. From 1890 to 1898 he was governor of Transcaspia, and in the war with Japan (1904) he was made commander-in-chief of the Russian army; but at his own request he was superseded by General Linievitch in March 1905, and was appointed to the command of the First Manchurian army. He is the author of works

on the Balkan campaign and the Central Asian wars. See RUSSO-JAPANESE WAR.
Kurrachee. See KARACHI.
Kursk. (1.) Government, Central Russia; area, 17,937 sq. m., pop. (1897) 2,396,577. It is mostly flat plain, but in the E. part there are limestone and sandstone hills, rising to 1,110 ft. There are many small streams belonging to the

basins of the Don and Dnieper. Most of the soil is black earth. Wheat, millet, hemp, tobacco, beetroot are raised. The cattle are celebrated. No part of Russia is more noted for its orchards and honey. The industries include distilleries and breweries, sugar refineries, tanneries, soap, candle, and tobacco manufactures, brick works, flour mills, copper and iron foundries, woollen manufactures, and potteries. The region of Kursk seems to have been first brought under Russian rule by Oleg, Grand-Prince of Kiev, in 884; from the 14th to the 18th century it formed part of what was called the Russian or Muscovite Ukraine (or frontier) in opposition to the Polish Ukraine, which adjoined it on the w. and s.w. In 1797 the government of Kursk was formed. It is now divided into fifteen districts—those of Kursk, Bielgorod, Graivoron, Dmitriev, Korocha, Lgov, Novii-Oskol, Oboyan, Putiol, Rilsk, Tim, Starii-Oskol, Suja, Fatej, Shehigri. Almost all the people belong to the Russian race and to the Orthodox Church; there are 15 district towns, 3 lesser towns, 937 villages, 1,564 hamlets. The free peasant emigration from this government to Siberia has been very extensive of late years. (2.) Town, cap. of above gov., 330 m. s. of Moscow. The industries include carriage works, tobacco, soap, and wax-candle manufactures, distilleries and breweries, tanneries, iron foundries, and flour mills. Kursk suffered much from the rioting and outbreaks which followed the close of the Russo-Japanese war in 1905. Pop. (1897) 52,910.

Kurtz, JOHANN HEINRICH (1809-90), German church historian, was born at Montjoie, near Aachen. From 1850 to 1870 he was professor ordinarius of church history at the Universities of Halle and Bonn. His works have enjoyed great popularity as academic text-books, especially the *Lehrbuch der Kirchengeschichte* (1849; new Eng. trans. 1888-90). He also published *Astronomie und Bibel* (1842; New York, 1857); *Lehrbuch der heiligen Geschichte* (1843; trans. 1855); *Christliche Religionslehre* (1844); *Biblische Geschichte* (1847; Eng. trans. 1867); *Geschichte des alten Bundes* (1848-55; trans. 1863); *Der A.T. Opfercultus* (1862; trans. 1863); *Abriß der Kirchengeschichte* (15th ed. 1901).

Kuruman, station in British Bechuanaland, 90 m. w. of Vryburg, is a settlement of the London Missionary Society.

Kushk, fort, post, just within the Russian frontier, less than 90 m. N. of Herat. It is the terminus of the s. branch (Merv-Kushk) of the Russian Central Asiatic Ry.

Kushtia, munic. tn., Nadiya dist., Bengal, India, on r. bk. of Ganges, 60 m. s.e. of Murshidabad. Pop. (1901) 5,330.

Kusi, Kosi, or Koosy, riv., N. Bengal; has its source in the Himalayas of Nepal, runs s.w., s.e., and finally s., and enters the Ganges. It has a rapid flow, and is liable to floods. Length, 325 m.

Kuskoquim, second largest river in Alaska, over 500 m. long, flows s.w. into Kuskoquim Bay. It is navigable for 300 m.

Küssnacht, vil., Switzerland, 6 m. E.N.E. of Lucerne, at N. end of Lake Lucerne; is associated with the romance of William Tell and Gessler. Pop. (1900) 3,562.

Kustanaik, tn., Turgai prov., Russian Central Asia, on Tobol R., 600 m. E. of Orenburg. First called Nikolaievsk, it has grown up since 1871. Its industries include tanneries, potteries, and the manufacture of tallow. Pop. (1897) 14,065.

Kustendil, or KÖSTENDIL, tn., Bulgaria, 45 m. s.w. of Sophia. It is the seat of a Greek Orthodox archbishop. Fruit and vine culture is carried on. There are many antiquities and warm mineral waters. Pop. (1900) 12,003.

Küstenji. See CONSTANTIA.

Küstrin, fort. tn., Prussian prov. Brandenburg, on r. bk. of Oder, at confluence of Warthe, 52 m. by rail E. of Berlin. Beer, hardware, machinery, and cigars are manufactured. Pop. (1900) 16,473.

Kutayah, or KUTAYA, tn., Turkish prov. Brusa, Asia Minor, 70 m. s.e. of Brusa; is surrounded by gardens and orchards. Carpets and pottery are manufactured, and opium is grown; has an ancient Byzantine fortress. Pop. (1904) 40,000.

Kutais. (1.) Russian gov., Transcaucasia, extends N. from the Turkish frontier round the E. end of the Black Sea. The interior is exceedingly mountainous, while the coast is marshy and unhealthy. Manganese ore, coal, copper, and galena are mined. Forests cover a large part of the surface, and timber, especially walnut, is exported. Good tobacco is grown, and fruit is abundant; olives in the south. Tea has been cultivated during the last ten years. The ports are Batum, Poti, and Sukhum Kali. Area, 14,084 sq. m. Pop. (1897) 1,075,861. (2.) Town of above gov., on the Rion, 110 m. w. by N. of Tiflis; is supposed to be the Kutatision of the Argonauts. In the 5th century A.D. it was destroyed by the Persians. The present town has been built within the last half-century. There are remains of the golden palace of the kings of Imeritia. Gardening is carried on. Pop. (1897) 32,492.

Kutch. See CUTCH.

Kutno, tn., Warsaw gov., Russian Poland, 80 m. w. of Warsaw city. It has breweries and distilleries. Pop. (1897) 11,213.

Kuttenberg, tn., Bohemia, Austria, 30 m. by rail E.S.E. of Prague. It has a former royal castle (13th century), and manufactures tobacco, sugar, liqueur, cotton, and calico. In the middle ages silver was mined here, and Kuttenberg was often a royal residence. Pop. (1900) 14,799.

Kutusoff, MICHAEL ILARIONOVITCH (1745-1813), Russian field-marshal, served in the Turkish wars (1770, 1788-92), distinguishing himself at Shumna Otchakov, Hadji-Bei, Bender, and Ismail; and in 1805 commanded an army corps against the French, leading at Austerlitz. In 1812 he was commander-in-chief of the Russian army, and was defeated by Napoleon at Borodino, but defeated Ney and Davout at Smolensk. See *Life*, in French, by Michailovsky-Danielevsky (1850).

Kuty, tn. of Austrian Galicia, 35 m. w. of Czernowitz. Morocco leather is manufactured, and pitch, tar, and resin are extracted. Pop. (1900) 11,127.

Kuvera, the Hindu god of wealth.

Kuyper, ABRAHAM (1837), Dutch statesman and author, born at Maassluis; became pastor of the Reformed Dutch Church (1863). He also took active part in politics, and in 1901 was appointed prime minister, as leader of a coalition of Calvinists and Roman Catholics. He has edited *De Standaard* (1872) and *Herant*; founded the Free University of Amsterdam (1880), and in 1886 the Free Reformed Church. His chief work is *Encyclopaedia of Sacred Theology* (1901); he edited the works of John à Laska (1866).

Kuznetsk. (1.) Town, Saratov gov., E. Russia, 150 m. N.N.E. of Saratov city. The industries include tanneries, boot and glove factories, leather-dressing, harness-makers', wheelwrights', joiners', and bushel-makers' workshops. Pop. (1897) 23,849. (2.) Town, Tomsk gov., Siberia, over 200 m. s.e. of Tomsk, in the mining region of the Kuznetski Ala-tau. Pop. 8,980.

Kwala Lumpur. See KUALA LUMPUR.

Kwang-chau-fu. See CANTON.

Kwang-chau-wan, bay on E. coast of Lei-chau peninsula, Kwang-tung, China; the harbour, 20 m. long and from 1½ to 6 m. broad, is completely landlocked. The bay, with the adjoining coast, was leased to France by China in 1898.

Kwang-hsu (1871), emperor of China, born in Peking; succeeded to the throne in 1875. He owes his position to the intrigues

of the Empress Tsu-hsi, his aunt, who held the regency during his minority. She again made herself regent in September 1898, and since then Kwang-hsu has been a mere puppet in her hands.

Kwang-si, inland prov. of S. China, borders with Kwang-tung and Tong-king on the s., and Yün-nan on the w. Area, 78,250 sq. m.; 480 m. long by 300 m. broad. The province has suffered greatly from rebellions and famines. Its eastern half is by far the more important; the western half is largely composed of downs reaching to the foot of mountains, and is thinly inhabited. The chief exports are cassia, sugar, tobacco, and rice. Part of the province is inhabited by Shans. Kwei-lin-fu is the capital, and Wu-chau and Nanning are treaty ports. Lung-chau is opened to trade with Tong-king. Pop. (1902) 5,142,330.

Kwang-tung, maritime prov. of S. China, borders on the E. with the China Sea, and on the s. with the Gulf of Tong-king. Area, 79,456 sq. m. Greatest length, from N. to s., about 420 m.; from E. to w., 370 m. It is a semi-tropical country, containing the lower basin of the west, north, and south rivers, which combine to form the delta of Canton, together with the basin of the Han R., which has its mouth at Swatow. A rich alluvial soil, heavy rainfall, and good network of waterways, combined with its position at the entrance to the China Sea and with a deeply-indented coast and good harbours, give Kwang-tung great natural advantages. Rice, tea, sugar, silk, porcelain, wood and ivory carvings, furniture, grass mats, paper, and embroideries constitute its chief industries. Oranges, bananas, and subtropical fruits, salt and fresh water fish, shell-fish, tobacco and vegetables, coal and iron, are among its other products. Cap. Canton. Pop. (1902) 31,865,251.

Kwang-yen, cap. of prov. Kwang-yen, French Indo-China, 70 m. E. of Hanoi, and 6 m. from the sea, on the N. arm of Song-koi delta. It is accessible to the largest vessels at all states of the tide, and commands the coast route between Tong-king and Kwang-tung. It is the sanatorium of Tong-king. Pop. (1897) 2,100.

Kwanza. See COANZA.

Kwei-chau, inland prov., China, borders with Sze-chuen on the N. and Yün-nan on the w. Area, 64,554 sq. m.; a limestone region, with an altitude of 5,000 ft. in the w., falling gradually to 2,000 ft. in the E. The deep ravines in which the numerous rivers lie occasion frequent descents and ascents on almost

all routes. The population is very sparse, in consequence of rebellions and their results, and much land is uncultivated. Mineral resources are rumoured to be very great, and to include gold, silver, copper, tin, lead, quicksilver, and coal. Besides the Chinese population, there are Los in the N.W., Shans in the S., and Miaotzu in the E. Opium is the all-important product, serving as currency for export. The wax-producing insect is exported to Hu-nan. A sturdy breed of diminutive ponies, well suited for mountain work, is used within the province, where carts are hardly known. Kwei-yang-fu is the capital. Pop. (1902) 7,650,282. See Hosie's *Three Years in West China* (1897).

Kwei-yang-fu, cap. of prov. Kwei-chau, China, 213 m. S. of Chung-king; is of great commercial importance. Coal mines W. of the town.

Kwenlun. See KUENLUN.

Kyaukpyu, dist., Arakan, Lower Burma, with area of 4,387 sq. m.; contains some of the most fertile lands of the province. Pop. (1901) 167,594. Kyaukpyu, the capital, is a seaport and municipal town, 115 m. W.N.W. of Promé. It exports earth-oil. Pop. (1901) about 3,650.

Kyaukse, dist., Meiktila, Upper Burma, with area 1,274 sq. m. It is mainly a level strip at the foot of the Shan Hills, but reaches 5,000 ft. in the E. From the original nine canals of the district, it is also known as Ko-Kayaing. Pop. (1901) 141,296. Kyaukse, the cap., is a munic. tn., 360 m. by rail N. of Rangoon. Pop. (1901) 7,201.

Kyd, or KID, THOMAS (?1557-?95), English dramatist, was born probably in London, and was the author of several successful tragedies of the blood-and-thunder school. The best known is *The Spanish Tragedy* (printed 1594), one of two plays dealing with the life of Hieronimo (Jeronimo), a Spanish marshal. He also adapted several plays from French sources. Ben Jonson and others ridiculed his bombastic style. The *Ur Hamlet* is attributed to him. See *Works*, ed. by Boas (1901).

Kyffhäuser, wooded hill (1,450 ft.) in German principality of Schwarzburg-Rudolstadt, 35 m. by rail N. of Erfurt, with ruins of a 10th-century castle. German legend tells how the Emperor Barbarossa (Frederick I.; though the story was originally associated with Frederick II.) sits sleeping in the heart of the hill, but will one day, when his country is in desperate straits, awaken and restore her to glory and power. A gigantic monument to the Emperor William I. was erected on the hill in 1896.

Kyle, anc. dist. of Ayrshire, Scotland, separated from Cunninghamham in the N. by the Irvine, and from Carrick in the S. by the Doon.

Kyles of Bute, sound between the N. end of island of Bute and Argyllshire, Scotland, with beautiful scenery; is tourist-steamer route.

Kyneton, tn., Dalhousie co., Victoria, Australia, 53 m. N. of Melbourne. It has a school of mines, and makes vehicles and agricultural implements. Pop. (1901) 3,371.

Kyô sai, SHO-FU (1831-89), Japanese painter, who excelled in political caricature; this led to his frequent imprisonment during the revolutionary period of 1867. A number of his works dealing with Japanese life are in the British Museum. He published several books of drawings; the last, *Kyô sai Guaden* (1887), contains an autobiography. See Mortimer Menpes's 'Personal View of Japanese Art,' in *Magazine of Art* (1888).

Kyoto. See KIOTO.

Kyrie Eleison ('Lord, have mercy'), liturgical phrase used in the worship of the Roman Catholic Church. It follows immediately after the introit, and is sung three times, then *Christe eleison* three times, followed again by *Kyrie eleison* three times. Its Anglican equivalent is used in morning and evening prayers, the Litany, and after the recitation of each of the ten commandments.

Kyrle, JOHN (1637-1724), 'the Man of Ross,' as Pope calls him in his *Moral Essays*, was born at Dymock, Gloucestershire, and lived nearly all his life at Ross, Herefordshire. He devoted the greater part of his income to the building of churches and hospitals, and his time to the welfare of his neighbours. The Kyrle Society was founded by the Misses Hill in 1877, for the purpose of bringing 'sweetness and light' into the lives of the poor.

Kyshtym, mining and iron-working centre of Perm gov., E. Russia, on E. side of Urals, 55 m. E. of Chelyabinsk; is composed of two settlements, Upper and Lower. Pop. (1897) 12,331.

L

L is called a side consonant, because the breath passage is blocked by the tongue in the middle, but not at the side: its channel is the side passages. There are many varieties even of the voiced *l*: for example, the English and French sounds are distinctly different, and three pronunciations of Latin *l* have been distinguished. There is a voiceless *l* in Welsh, which is written *ll* (Llangollen). In English the sound has become silent in many words ('palm,' 'would,' 'walk'). In form *L* closely resembles the early Semitic sign; the lower curve in *ل* is an Aramaic addition; the right-hand stroke of *Λ* was at first quite short, and that form is a modification of *L*. The Semitic name *lamed*, Greek *lambda*, means 'goad.'

L, as a symbol, is used in numerals for 50, and with a line drawn above it (*L̄*) for 50,000; in commerce, for a pound or pounds sterling.

L.A., Law Agent, and Literate in Arts.

Laager, South African wagon camp; first adopted for defensive purposes by the Dutch pioneers while *trekking* or travelling through a hostile country. The camp defences consist of ox-wagons set close together, generally in circular form, the spaces below the wagon being heaped with baggage.

Laaland, or **LOLLAND**, Danish island in the Baltic, s. of Sjælland; area, 444 sq. m. Its greatest length is about 36 m.; its breadth varies from 10 to 17 m. The coast is much indented, the land relatively low, but very fertile. In early times it was largely populated by Wends from the s.e. Baltic coast opposite. Cap. Maribo. Pop. (1901) 70,596.

Laar, or **LAER**, **PIETER VAN** (c. 1613-74), Dutch painter, called 'Bamboccio' and 'Snuffelaer,' was born at Haarlem; studied and painted at Rome until 1639. He painted chiefly rural fairs and hunting scenes, pictures technically known among the Italians as *bambocciate*, hence his appellation. Examples are to be seen in the Louvre and the galleries of Dresden, Vienna, and Kassel.

Labadie, **JEAN DE** (1610-74), French mystic, born at Bourg, near Bordeaux; was in turn Jesuit preacher, secular priest, and Huguenot pastor at Montauban and Geneva. Although accused of immorality and sedition, he became famous for his eloquence. Expelled by the Synod of Dort, he founded the sect of

Labadists. He wrote some thirty doctrinal works. See the *Eucleria* of Anna Maria von Schürmann.

La Barca, tn., Jalisco state, Mexico, E. of Lake Chapala, and 60 m. by rail s.e. of Guadalajara. It was the scene of two battles during the Mexican war of independence. Pop. about 8,000.

Labarum, the name given to the imperial standard in the ancient Roman army after the time of Constantine (306-337 A.D.), by whom it was introduced in place of the Roman eagle. It consisted of a long staff, crossed by a transverse beam, from which hung a banner of purple silk, embroidered with the likenesses of the reigning monarch and his children. At the upper end of the staff was a golden crown, encircling the monogram composed of the cross and the initials of the name of Christ. See Gibbon's *Decline and Fall*.

Labdacus, in ancient Greek legend, was a king of Thebes, the son of Polydorus, father of Laius, and grandfather of Œdipus. The patronymic Labdacidae is used to designate his descendants in general. See the works of ÆSCHYLUS, SOPHOCLES, and APOLLODORUS.

Labé, **LOUISE**, née CHARLIN (1526-66), styled 'la Belle Cordière,' French poetess, was born at Lyons, and married Ennemond Perrin, a ropemaker—whence her sobriquet. She was famous alike for her beauty and her impassioned poetry, and composed sonnets, elegies, and dialogues, entitled *Le Débat de Folie et d'Amour*, translated into English (1608) by Robert Green the poet. She was a remarkable linguist, writing idiomatically in Latin, Italian, and Spanish. Her works were first published at Lyons in 1555. See De Ruolz's *Discours sur la Personne et les Ouvrages de Louise Labé*, Nicéron's *Mémoires* (1727-40), and Boy's *Recherches sur la Vie et les Œuvres de Louise Labé* (1887).

Label, or **LAMBEL**, in heraldry, is the mark of cadency of the eldest son. It consists of a fillet, from which hang three short teeth or squares. Formerly, the number of these pendants was greater—five, or even more—and the label was placed at the very top of the shield. In modern times it is borne somewhat lower, and unconnected with the edges of the shield, though always in chief. The label is sometimes called a *file*, and then the pendants are designated *labels*. These are sometimes charged—e.g. in the arms of the younger members of the royal family—to distinguish

their coats from that of the Prince of Wales, whose label—as that of the eldest son—is always plain.

Labellum, a name given to one of the lobes of the perianth in the flowers of orchids and certain other plants.

Labels, **PLANT**, add to the interest and value of most gardens. Where the labels are required only for a short season, soft deal labels are the most serviceable. These should be thickly coated with white paint, and the lettering written on them before the paint is quite dry. For permanent use, labels of zinc or lead with raised or depressed lettering, made more conspicuous by means of paint, are the most suitable. A very satisfactory substitute is provided by pieces of sheet zinc written upon with a special ink made for the purpose.

Labeo, **M. ANTISTIVS**, a famous jurist in ancient Rome. His father, also eminent as a jurist, was one of the conspirators against Julius Caesar in 44 B.C., and committed suicide after the battle of Philippi. Like his father, the younger Labeo was a republican, and as such was regarded with disfavour by Augustus. He is said to have written four hundred books, quotations from which are to be found in Justinian's Digest. See Lenel's *Palingenesia Juris Civilis* (1889), and Roby's *Introduction to the Study of Justinian's Digest* (1884).

Laberius, **DECIMUS** (c. 107-43 B.C.), a Roman knight, famous as a writer of mimes or burlesque dramas, who had the courage to point his satire against Caesar. His writings are highly spoken of for their wit and force. Only fragments remain, which are to be found in Bothe's *Poete Scenici Latinorum*, vol. v., and in Bæhren's *Poete Latini Minores*. See Suetonius's *Life of Julius Caesar*, Mommsen's *Hist. of Rome*, and Teuffel-Schwabe's *Latin Literature*.

Labiata, a natural order of dicotyledonous plants, a large number of which are remarkable for their fragrance of flower and leaf. The plants belonging to the order, of which there are over 120 genera and 2,500 species, are distinguished by having flowers with irregular two-lipped corollas, the lower lip being three-lobed, four-celled ovaries, single styles, square stems with opposite leaves, and the stamens are two or four in number. Among the genera are *Prunella*, *Melittis*, *Calamintha*, *Nepeta*, *Stachys*, *Lamium*, *Be-*

tonica, Ajuga, Tencium, Origanium, Thymus, Mentia, and Salvia. Such well-known sweet and pot herbs as lavender, sage, mint, marjoram, thyme, savory, and balm belong to this order.

Labiche, EUGÈNE MARIN (1815-88), French dramatist, was author or part author of more than a hundred vaudevilles, and for many years one of the most popular dramatists in France. He was born and died in Paris, where his first play was produced in 1838. Much of his best work was done in collaboration with such men as Delacour, Dumaître, Clairville, Duru, Legouvé, Barrière, and Augier. A complete collection of his plays—of which perhaps the best known are *Le Chapeau de Paille d'Italie* (1851), *Le Voyage de M. Perrichon* (1860), *La Poudre aux Yeux* (1861), *La Cagnotte* (1864), *Le Choix d'un Gendre* (1869), *Le Plus Heureux des Trois* (1870)—was published in 10 vols., in 1878-9. See Jules Claretie's *Eugène Labiche*.

Labienus, TITUS ATIVS, was tribune of the *plebs* at Rome in 63 B.C., when, in pursuance of the programme of the democratic party led by Julius Cæsar, he prosecuted Rabirius for the murder of his uncle. When Cæsar went to his provinces in Gaul in 58 B.C., Labienus accompanied him as one of his lieutenants, in which capacity he earned great distinction. After 52 B.C. his rank in the army was next to that of Cæsar. When the civil war against Pompey broke out, Labienus deserted Cæsar and took Pompey's side, but proved of little assistance to his new associates. He was killed at the battle of Munda in 45 B.C. See Holmes's *Cæsar's Conquest of Gaul*.

Lablache, LUIGI (1794-1858), operatic basso, great alike as an actor and a vocalist. He studied at the Conservatorium in Naples, where he made his first appearance in opera (1812) in Fioravanti's *La Molinara*. He visited Paris and London (1830), and for many years made an annual appearance in these cities. Lablache had a voice of extraordinary volume and quality, with a compass of two octaves, from E₂ below the bass stave to E₄ above. Mercadante wrote for him *Elisa e Claudio*; Bellini, *I Puritani*; and Donizetti, *Don Pasquale*. His greatest creation was Dr. Bartolo in *Il Barbiere*.

Labri, FERNAND GUSTAVE GASTON (1860), French advocate, was born at Rheims. He defended the assassin Duval, Pini the anarchist, and the dynamiter Vaillant, and has taken part in several important literary causes. Labri won celebrity by his bril-

liant defence of Zola, charged with libelling the French executive and army (Feb. 1898), and by his conduct of the Dreyfus appeal at Rennes. Since that time he has dissociated himself from the party of Dreyfus. He was counsel for the defence in the notorious Humbert trial in 1903. Maître Labri is editor-in-chief of the *Grande Revue*, and he has published the *Répertoire Encyclopédique du Droit Français*, in 12 vols.

Labouchère, HENRY, BARON TAUNTON (1798-1869), British politician, descended paternally from a French Huguenot family, and maternally from a member of the banking house of Baring. He entered Parliament as a Whig in 1826; was M.P. for Taunton (1830-59); Chief Secretary for Ireland (1846-7); President of the Board of Trade (1839-41 and 1847-52), carrying the Navigation Laws Abolishment Act through the Commons against the efforts of the shipping interest; and Colonial Secretary (1855-8). Labouchère was created Baron Taunton in 1859.

Labouchère, HENRY DUPRÉ (1831), English journalist, M.P., and editor and proprietor of *Truth*, a society paper which he started in 1876. Educated at Eton, he entered the diplomatic service in 1854, but retired from it in 1864. He represented Middlesex (1867-8), and since 1880 has been one of the members for Northampton. In 1889 he placed himself at the head of the advanced Radicals, and was for a time spoken of as one of the most influential private members in the House. He was a member of the Jameson Raid Commission (1896). As 'A Besieged Resident' he contributed a series of extremely interesting letters to the *Daily News* during the investment of Paris in the Franco-German war. Subsequently he became city editor of the *World*, under Edmund Yates's management. His own journal, *Truth*, has been very successful in the exposure of a number of social, financial, and administrative scandals. For Mr. Labouchère's adventures as an *attaché* see Joseph Hatton's *Journalistic London*.

Laboulaye, ÉDOUARD RENÉ LEFEBVRE DE (1811-83), French jurist and author; born in Paris, and after a successful legal career became professor of comparative jurisprudence in the Collège de France (1849). Besides numerous works on French law, and several stories (*Contes Bleus*, *Pablo*, and others), he published the paradoxically-named *Histoire Politique des États-Unis, 1620-1789* (1855-66). Laboulaye edited the *Revue Historique de Droit* (1855-69), *Revue de Législation* (1870-6),

and *Nouvelle Revue Historique* (1877-83). See Wallon's *Notice sur la Vie de M. Ed. Laboulaye* (1889), and the *Nouvelle Revue Historique* for 1883.

Labour. The term labour as used by economists has all the ambiguities to which in popular usage the word is subject. Much of the ambiguity is due to the fact that labour may mean different things in production and in consumption, and to the further important distinction between the labourer's and the employer's point of view. Not only as a factor in production, but also in distribution, labour plays a very important part, and it is here that the labour difficulties arise. The share which labour receives of the product is called 'wages.' The distinction between the employer's and the labourer's points of view is just as important in distribution as in production, and the so-called conflicts of capital and labour generally arise from this. The socialist pleads for the disappearance of the 'capitalist'; but it seems from the first tentative efforts of the state employes at combination that the history of the labour question of the future may have to be entitled 'conflicts of the state and its employes.' See WAGES, SOCIALISM, ECONOMICS, and SLAVERY AND SLAVE TRADE.

Labour Colonies. With the object of reducing vagrancy throughout the country, and of assisting unemployed workmen, labour colonies have been instituted, although only on a small scale, by the Salvation Army, the Church Army, and a few other charitable bodies. On the Continent labour colonies have been carried on for many years, notably in Germany, where the system for assisting the travelling unemployed is very complete. A typical labour colony is that at Wilhelmsdorf, the earliest one founded. It is open to all able-bodied men willing to work, if there is room, and a colonist can leave at any time. The work is chiefly agricultural, and after the first fortnight the colonist is credited with a small sum weekly, in addition to free board and lodging. These sums accumulate, and are handed over to the colonist when he leaves. In another class of labour colonies there is the power of compulsory detention. The great bulk of the material, however, with which these institutions deal consists not of efficient workmen out of work, but of tramps, ex-prisoners, and other social wreckage. The higher type of labour colony—that intended as a remedy for urban overcrowding and want of employment—has been successfully founded in America and elsewhere. In Jan-

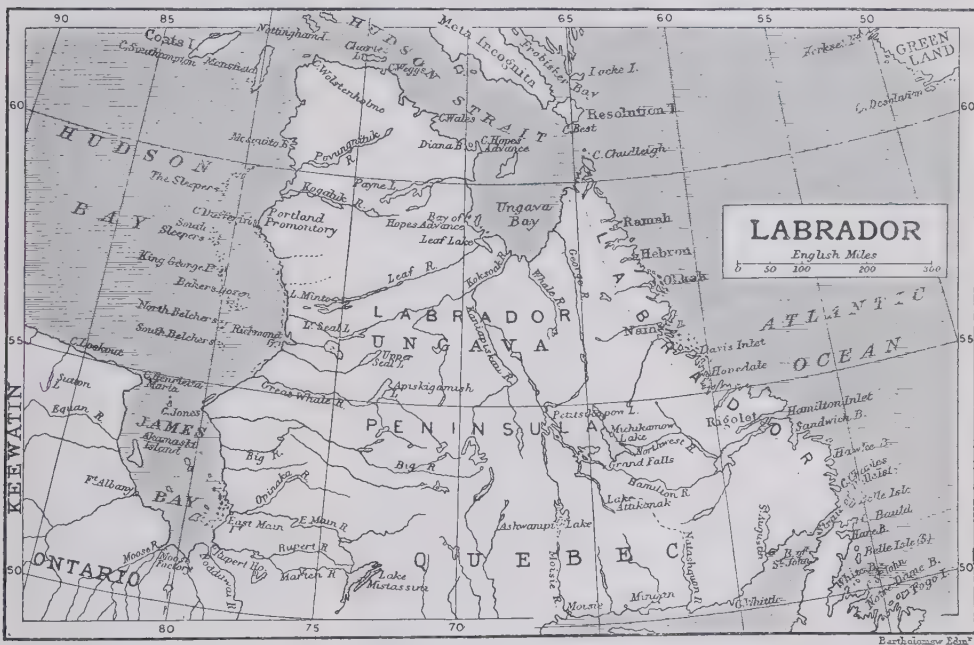
uary 1905 the Colonial Office commissioned Mr. Rider Haggard to proceed to the United States to inspect and report upon the settlements established there by the Salvation Army, with the view to the possibility of making similar colonies for the urban population of the United Kingdom in Canada and other parts of the Empire. Mr. Haggard reported strongly in favour of such settlements, and also suggested that the selection of suitable settlers from among the poor of Great Britain should be left to the Salvation Army officials. The London County Council have now established (1905) a labour colony for

In 1740 he began the conflict with the British for the naval sovereignty of the Indies, and in September 1746 captured Madras, but was bribed with £40,000 to restore it to the English. Du-pleix, the governor-general, refused to recognize this ransom, and secured the recall of Labourdonnais, who was accused of treachery and imprisoned in the Bastille (1748-52). See *Vie de Mahé de Labourdonnais*, by his grandson (1827); and *Labourdonnais Mémoires* (1750).

Labourers, STATUTES OF. The Black Death caused such an increase in the price of labour that the acts called Statutes of La-

and the families of any such persons who may be residing with them. Standing Order 183a of the House of Commons contains the same definition, and requires that the promoters of bills involving the compulsory purchase of land must not take more than twenty houses in any parish in London or ten in any other local area occupied either wholly or partially by persons belonging to the labouring classes without providing for rehousing them.

Labrador, an extensive peninsula on the E. of British N. America, lying between Hudson Bay and the Gulf of St. Lawrence. Its length is 1,100 m., breadth



the benefit of the urban unemployed at Hollesley Bay, Suffolk, which is proving successful.

Labour Day, a legal holiday in New York, New Jersey, Pennsylvania, and other American states, held on the first Monday in September, and celebrated by labour processions and assemblies in the chief towns. Since the Labour Congress at Berlin (1890) the 1st of May has been dedicated to labour demonstrations in several of the European countries.

Labourdonnais, BERTRAND FRANÇOIS MAHÉ DE (1699-1755), French admiral, born at St. Malo; served gallantly in the French East India Company's navy, and successfully governed Bourbon and the Ile de France (1733-40).

bourers were passed in 1349 and 1350, and extended to London and the Cinque Ports in 1357. They fixed wages at the rates which prevailed in 1347, and forbade the movement of labourers in search of higher wages. The statutes were always ineffectual, and were repealed in 1863.

Labouring Classes. These were defined by the Metropolitan Police Act, 1836, as including mechanics, artisans, labourers, and others working for wages, hawkers, costermongers, persons not working for wages but working at some trade or handicraft without employing others except members of their own family, and persons, other than domestic servants, whose income does not exceed an average of thirty shillings a week,

470 m., and area 530,000 sq. m. It is shared between Canada and Newfoundland. The interior is very imperfectly explored, but it is known to be sterile. It consists of a high plateau, rising in places to 2,000 ft. The climate, even on the coast, is much too severe to ripen ordinary cereals, although it lies in the same latitudes as the N. parts of the United Kingdom. Its shores are washed by an icy Arctic current, which is responsible for its low mean annual temperature of 24° F. The Atlantic coast is bold and rugged, and there are a number of fine harbours and deep inlets, the most important of which are Hamilton Inlet, into which flows Hamilton R., and Ungava Bay. The interior is un-

inhabited, but along the E. coasts there is a fringe of settlements. The Hudson's Bay Company maintains a few scattered factories, and the Moravian missionaries to the Eskimos have supported a number of stations since 1770. The extent of the Indian population is unknown; they are of the Algonquin tribe. The permanent coast population, which is largely half-breed, is about 5,000, but there is a migratory summer population of 30,000 engaged in the shore fisheries, which are remarkably productive. Labrador was probably first discovered by the Norsemen about 1000; rediscovered by the Cabots in 1497; and was early frequented by Basque fishermen, and later by Bretons, who founded (1520) a town called Bröst in Bradore Bay, the ruins of which may still be seen. The peninsula was transferred by the treaty of Paris (1763) to Great Britain, and the S. and E. shores were handed over to Newfoundland. Part of the peninsula belongs to the province of Quebec, the boundary on the E. being at Blanc Sablon, near the Strait of Belle Isle; most of the remaining area, draining into Hudson Bay, now forms the territory of Ungava, and a narrow strip on the E. coast, with an area of 119,000 sq. m. and a population (1901) of 3,947, is now officially known as Labrador. See Hind's *Exploration of the Labrador Peninsula* (1863), Holme's *Proceedings Royal Geog. Soc.* (1888), and Grenfell's *Vikings of To-Day* (1895).

Labradorite, one of the commonest of the soda-lime feldspars or plagioclases, found in many crystalline rocks, such as basalt, gabbro, andesite, and diorite. It is usually colourless or gray, brown or green; sp. gr. 2.7, h. = 5 to 6. It is sometimes found in well-formed crystals embedded in the matrix of the rock; and at other times in large masses, in which the crystals are imperfect, though the cleavage is more or less distinct. Such masses have long been known from Labrador, and specimens from that locality have often a beautiful iridescent lustre. They may also show distinct, straight, parallel bands, which are produced by twin-plates. (See MACLES.) Labrador spar is used as a semi-precious stone for the preparation of ornamental boxes, paper-weights, brooches, stick handles, and clock panels. See Streeter's *Precious Stones and Gems*.

Labridæ, a family of fishes belonging to the order Teleostei. See WRASSES.

La Bruyère, JEAN DE (1645-96), French writer, born at Paris, took his licence in law at Orléans in 1665, and was called to the

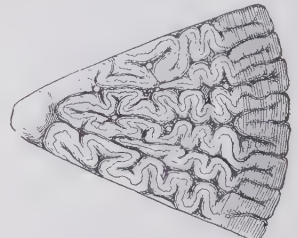
Paris bar. In 1673 he purchased the office of treasurer of finances for Caen, a post which provided a comfortable income, but did not make him give up residence in Paris. In 1684, on the recommendation of Bossuet, he became tutor to the Duc de Bourbon, grandson of the great Condé, and he continued to reside in the household of Condé till his death. A man of retiring and studious disposition, he preferred to be a spectator of the endeavours of others for worldly success rather than to strive for his own advancement. What he saw he has reflected in *Les Caractères de Théophraste, traduits du Grec, avec les Caractères ou les Mœurs de ce Siècle* (1688). The book brought him, as was predicted, many readers and many enemies. He continually revised and augmented his *Caractères*, and as many as nine editions had appeared by the year of his death. As a writer of *pensées* and maxims he is held to be inferior to Pascal and La Rochefoucauld. But he is one of the masters of French prose. His style, which is studiously varied, and is scrupulously correct, marks the change from the more periodic manner. His *Dialogues sur le Quétisme*, published posthumously in 1699, adds nothing to his fame. See editions of his works by Walckenaer (1845), Servois (1865, etc.), and Asselineau (1871); also Fournier's *La Comédie de la Bruyère* (1886); Sainte-Beuve's *Portraits Littéraires*, and *Nouveaux Lundis*; and Pellissou's *La Bruyère* (1892).

Labuan, isl., 6 m. off the N.W. coast of Borneo; area, 30 sq. m. It is flat, well wooded and watered, and is noted for its extensive coal measures. Sago is the principal product. Victoria (pop. 1,500), on the S.E. coast, affords an excellent anchorage. The island was transferred to the British N. Borneo Company in 1890, having previously been a crown colony from 1846, when it was ceded by the sultan of Borneo to Britain. It is in direct cable communication with Singapore, Hong-kong, and Sandakan. Pop. (1901) 8,400, chiefly Chinese and Malays.

Laburnum is a genus of hardy leguminous trees, natives of S. Europe and Asia Minor. They are of great beauty, and are among the most popular of our garden flowering trees. They bear drooping racemes of yellow, papilionaceous flowers, the calyxes having each two short, obtuse lips; the fruit is a long pod. The best known species is the common laburnum, *L. vulgare*, which flowers in April and May, and of which there are several interesting varieties.

Labyrinth (Gr. λαβύρινθος) was the term applied to a building containing many winding passages, arranged in such a way that an exit was difficult to find. We are told by Herodotus that the earliest known labyrinth was in Egypt, and that the more famous Cretan one was a copy of it. The latter is said to have been constructed for King Minos by Dædalus to secure the Minotaur. The discovery by A. J. Evans of a huge, many-chambered building in Knossos, on the traditional site of Minos's palace, has led him to the conclusion that this palace was the original labyrinth. Its huge size and complexity caused its name to be used in the familiar sense; but originally it meant 'house of the labrys' or double-axe, a sign frequently found in the ruins. See Herodotus, bk. ii.; Kingsley's *Heroes* (for the labyrinth in legend), also Apollodorus and Hyginus; and the *Journal of Hellenic Studies* (1900, 1901).

Labyrinthodonts. This name was originally given by Professor Owen to certain extinct fossil amphibians on account of the structure shown by a cross section of their teeth. The labyrinthodonts are now regarded as a sub-order of the Stegocephala, and include large amphibia which in general habit resembled a newt or salamander. In some cases their skulls were nearly two feet in length, and covered by large sculptured bony plates. Their limbs were comparatively small, and are not well known. On the



Section of Tooth of Typical Labyrinthodont.

under surface of the body they were provided with a breastplate of bony scales. Remains of large labyrinthodonts are found in the Carboniferous and Permian strata. Among the best known genera are *Archegosaurus*, *Loxomma*, and *Mastodonsaurus*.

Lac. See LAKE, and SHELLAC.
La Caille, NICOLAS LOUIS (1713-62), French astronomer, born at Rumigny; he was the first to determine accurately the length of an arc of the meridian. He became mathematical professor at the Collège Mazarin (1740), and a member of the

Académie des Sciences (1741). While on a visit to S. Africa he made astronomical observations, and determined the position of upwards of 10,000 stars, resulting in his *Colum Australe Stellariferum*, posthumously published by Maraldi (1763). He also wrote *Observations sur 515 Etoiles du Zodiaque* (1762-3).

Lacaita, SIR JAMES PHILIP (1813-95), Italian scholar and politician, who, as a Neapolitan advocate, aided Gladstone in his exposure of Bourbon misrule. He came to London (1852), and was appointed professor of Italian at Queen's College. After the fall of the Bourbons Lacaita returned to Italy, and entered the Italian Parliament as deputy for Naples.

La Calprenède, GAUTIER DE COSTES, SEIGNEUR DE (1610-63), French novelist and playwright; won a high contemporary reputation by his novels, *Cassandre* (10 vols. 1642-50), *Cléopâtre* (12 vols. 1647-58), *Faramond* (7 vols. 1661-71), and *Les Nouvelles, ou les Divertissements de la Princesse Alcidiene* (1661). The classic names were merely grafted on to descriptions of his own time. See Körting's *Geschichte des Französischen Romans im XVII. Jahrhundert* (1891).

Lacandon, tribe of Maya-Quiché stock, inhabiting the region around Lacandon and Usamacinta Rivers of Chiapas (Mexico) and Guatemala, about the borderland between Yucatan and Guatemala; but they are now chiefly confined to the wooded district between Lake Peten and the Rio de la Pasión tributary of the Usamacinta. Their language is a dialect of the Maya of Yucatan.

Laccadive Islands, a group of coral islands in the Indian Ocean, only nine of which are inhabited. They belong to Great Britain, and lie about 200 m. west of the Malabar coast. Their surface is flat, low, and barren. Coconut is the chief plant, and coir (cocoanut fibre) is extensively manufactured. Other products are jaggery, cocoanuts, betel nuts, and rice. Commerce is carried on by native vessels. The group was discovered by Vasco da Gama in 1499. Area is estimated at 80 sq. m., of which 60 are banks and reefs. Pop. (1901) 10,274, consisting mainly of Moplahs, or Mohammedans of mixed Arab and Hindu descent.

Lace. There is little doubt that the worn edges of woven material first suggested an ornamental treatment which developed into lace. A hem is often somewhat clumsy; and if not hemmed, the edge will soon fringe itself. It is only a step further to plait or knot the fringe so formed with that geometrical

precision which was one of the earliest forms of ornamentation.

The next step was to arrange a network of threads upon a small square frame, crossing and interlacing them into various complicated patterns. Beneath this was gummed a piece of quintain or French lawn, so named from the town in Brittany where it was made. Then, with a needle, the network was sewn to the quintain by edging round those parts of the pattern that were to remain thick. The last operation was to cut away the superfluous cloth. This was called 'cut work,' and was the fashionable employment of ladies in the 16th century. It is also an industrial employment of to-day. Sewing or stitching machines, making various fancy stitches—such as the 'Cornelly' embroidery, the 'Overlock,' the 'Bonnaz,' and others—are employed on a form of cut work in which any opaque fabric is superimposed upon whatever description of net the treatment of the design may require. The design is then transferred in outline to the fabric, the machinist stitches all around the outlines, and the superfluous material is cut away where the net is to be exposed.

Lace, in the more exact sense, is a textile fabric of which both ground and pattern are entirely produced by the lacemaker either by the needle, in which case it is called 'needle point,' or on the pillow by means of a number of bobbins, each containing a supply of thread, and each at liberty to be manipulated independently. When produced by the latter method it is called 'pillow lace.' Both kinds are produced on a parchment pattern, but each has its own distinctive features.

Certain pillow-made laces claim the prefix 'point'—thus 'Point de Malines,' 'Point de Valenciennes.' Point also means a particular stitch, as 'Point de Paris,' or 'Point de Neige.'

Most of the best-known laces derive their names from the place of origin, or district most renowned for their production, as Brussels or Brabant (sometimes called 'Point d'Angleterre'), Venice point and rose or raised Venice point, Valenciennes, Mechlin or Malines, Languedoc, and many others. The principal exception to this rule is 'guipure,' characterized by a raised thick thread prominently and effectively disposed in the pattern. This thread is composed of a core of inferior material, such as cotton, covered with a superior material, as silk, or gold or silver thread, the complete cord being called guipure. The term 'guipure' is now applied to many celebrated makes of lace where a raised effect is produced

by similar means to the above. Lace, or more correctly lace-net, making by machinery dates from 1768, when a loop net was produced in saleable quantity by a development of the stocking-machine.

The warp machine (1775) was so much improved by the year 1810 that it was making nets and fabrics which are still in demand. The principle of the machine is that of crochet fabric, as made by hand with the crochet-hook. Though the warp machine was so useful, there was still required a machine to make a twist net—that is, to manipulate the threads by mechanical means so that they should twist round one another. The twist-lace machine not only makes the threads twist round one another, but, by dividing them into two thread systems, also makes them traverse. One-half the threads are placed upon a cylindrical beam called a warp beam, and the other half are wound separately upon bobbins, which are really two thin discs of brass riveted together about midway between the centre and the periphery, the thin space from the rivets upward holding the cotton or other material. (See Fig.) This bobbin is dependent for its efficiency in working upon the receptacle that contains it, which is called a carriage, and may be described as a roughly triangular piece of thin iron or steel accurately segmental at the base, with an irregular opening stamped out of it, and comparatively central to the area of the metal.

The carriages, with their contained bobbins, vary in thickness according to the gauge of the machine in which they are to be used, the coarser gauges having only six to an inch, and the finer ones as many as thirty-six to an inch, all working side by side, and extending over the width of, say, 160 inches in the case of the fine machine used for fancy laces, up to 400 inches in the coarser machines used for curtains, each machine making its respective width of web.

The principle involved in all twist-lace machinery is perhaps best illustrated by a swinging pendulum, each individual carriage or shuttle containing the bobbin thread being passed through the warp threads with exactly the movement of a pendulum.

The motion is attained by constructing the machine to a circle of a given diameter, generally from 12 to 13 inches, the centre of such circle being the point where the fabric is formed, the carriages being moved or swung in the lower portion of the circumference of the circle, and the bot-

toms of the carriages being a true segment of this circle. The grooves or 'combs' by which the segmental base of the carriages are at the same time sup-

ported and kept at the same fractional distance apart, have their continuity broken midway between their extremities, thus forming an opening sufficiently

wide to enable the warp threads to work in a well-defined movement at right angles to the plane of the carriages; and if such movement is so limited as to

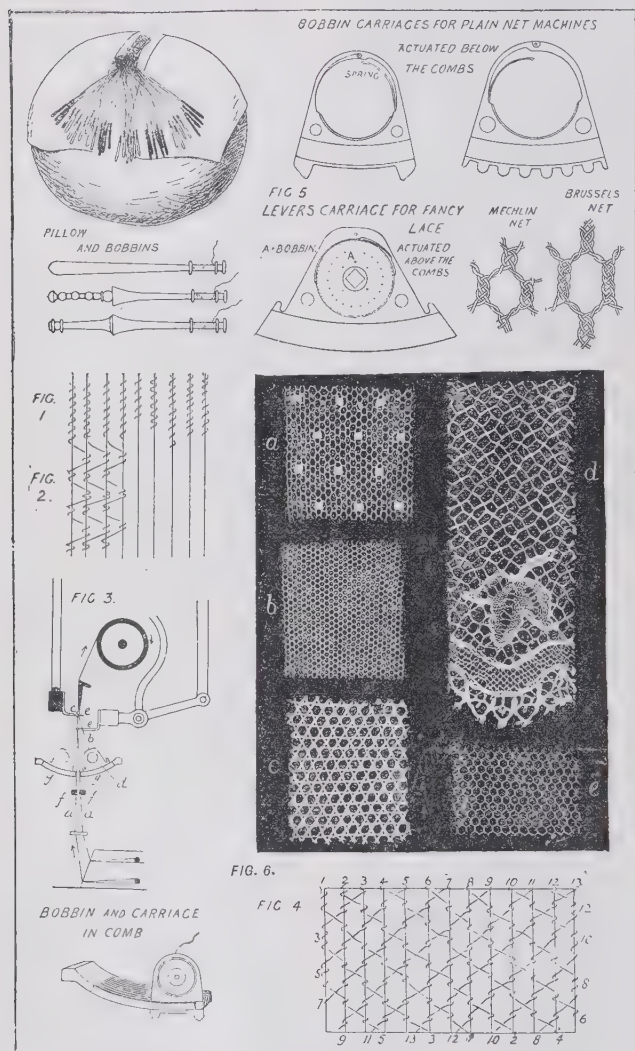
—to the right as the carriages pass in one direction, and to the left as they pass in the other—a series of twisted pillars, each composed of a bobbin thread and a warp thread, would be produced, and each pair of threads would be entirely distinct and apart from its neighbouring pair (Fig. 1), nothing in the nature of a fabric being produced. But should the guide bar or bars that control these warp threads have their movement so arranged that at certain regular intervals it extends over the space of two carriages, a connection will be formed between all the neighbouring pillars of the warp (Fig. 2), and a net will be produced called Mechlin, or Malines.

The machinery used in the various departments of the lace trade varies mechanically according to the particular purpose for which it may be required, but the fundamental principle remains the same. The carriages, it will be seen, vary accordingly. Some may be acted upon from above, as in the case of the Lever's carriage (Fig. 3), or from below (Fig. 5). In Fig. 3 is shown the mechanism of a Lever's machine, *a* being the bobbin and warp thread, with the points *e* just taking up the twist to the centre of the circle at *c*. The dotted lines merely show the extreme movement of carriage on either side of the warp threads *a*. The traverse bobbin net machine was invented by John Heathcote in 1809-11, and the Lever's machine by John Lever in 1813. See Felkin's *History of the Machine-wrought Hosiery and Lace Manufactures* (1867); Beebe's *Lace, Ancient and Modern* (1881); Lefebure's *Embroidery and Lace* (Eng. trans. by Cole, 1888); Palliser's *History of Lace* (new ed. 1902); Caulfield and Saward's *Dictionary of Needlework* (1882); and Moore's *The Lace Book* (1905).

Lace-bark is the popular name given to two species of *W. Indian* trees, which constitute the genus *Lagetta*, a subdivision of the order *Thymelæaceæ*. One of these species, *L. lintearia*, is grown in this country as a stove plant. It is evergreen, grows to five feet in height, and it bears white flowers of some beauty; but its chief interest is the inner bark, which, when macerated and stretched laterally, resembles coarse lace. The *Lagettas* are not difficult to cultivate, a peaty soil being mainly required. They can be propagated in spring by cuttings.

Lace Corals, a name given to some species of *Polysoa*. See *POLYSOA*.

Lacedæmon. See *SPARTA*.

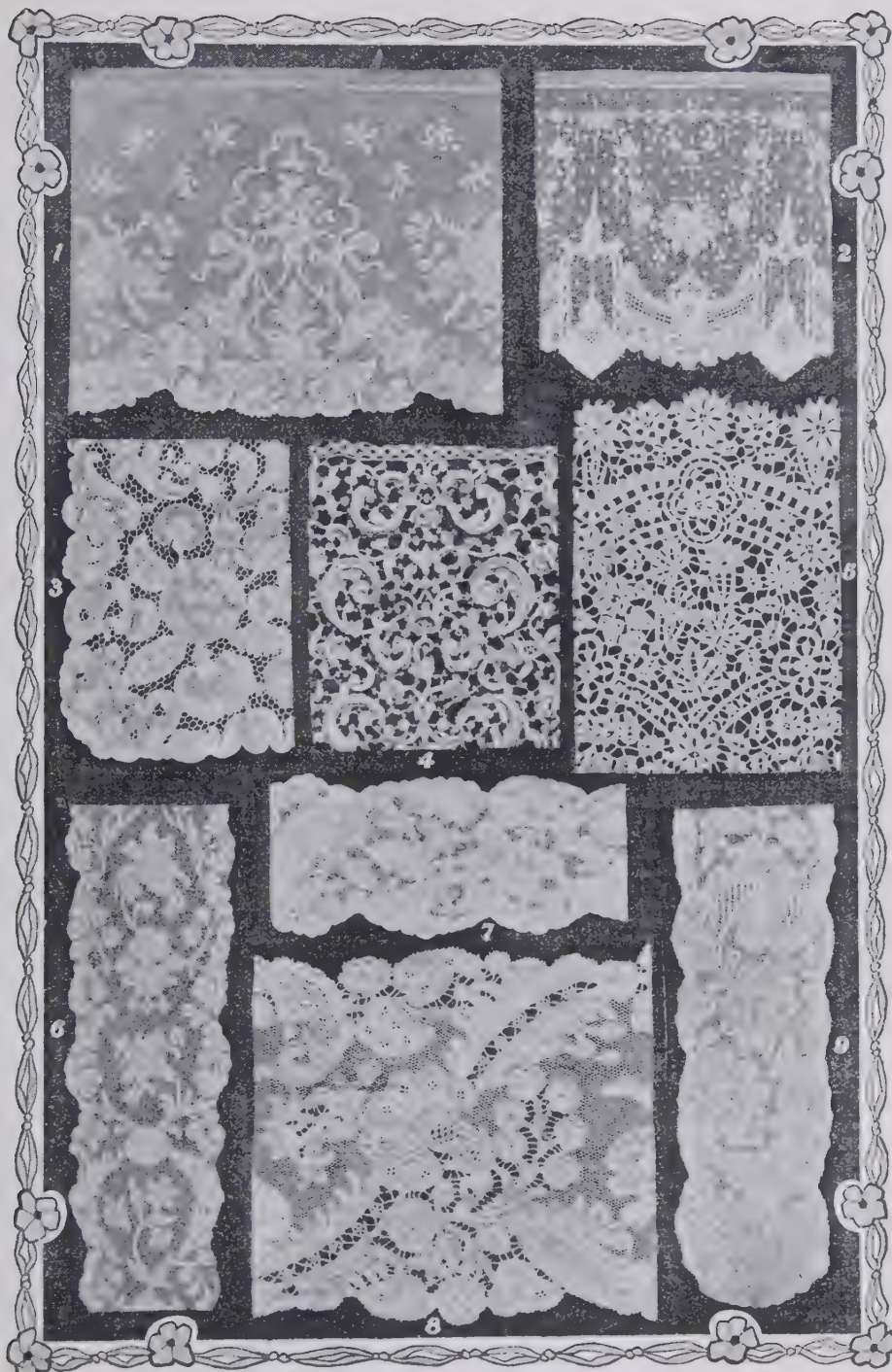


Lace Manufacture.

Fig. 3. Diagrammatic transverse section of Lever's machine.—The warp threads *aa* receive a slight lateral movement from rods *ff*, which enables the bobbin carriages *dd* to pass on either side of them; the combs *gg*, having a similar movement in opposite directions, the bobbin carriages are transferred, when required by the design, one step or more down the opposite comb. The points *ee* take up the twist to the central point *c*; *b* is the bobbin thread. **Fig. 6.** Examples of net.—*a*, Point d'Esprit, with spots made by special mechanical appliances; *b*, transverse bobbin net ('Brussels') made on plain net machine; *c*, Point de Paris, or point double; *d*, lace with mosaic net-ground; *e*, Mechlin or Malines net.

ported and kept at the same fractional distance apart, have their continuity broken midway between their extremities, thus forming an opening sufficiently

embrace only the fractional distance determined by the thickness of one carriage, or one 'gait,' as it is technically called, and this movement be continued



Examples of Lace, from the S. Kensington Museum.

1. Limerick, 1687. 2. Point d'Alençon, French, 19th century. 3. Point de France, late 17th century. 4. Point de Neige, Venetian, 1670-80 A.D. 5. Carrickmacross, late 19th century. 6. Valenciennes, 18th century. 7. Point de Venise à Réseau, Venice, early 18th century. 8. Brussels pillow and needle, late 18th century. 9. Mechlin pillow lace, 18th century.

Lacépède, BERNARD GERMAIN ETIENNE DE LAVILLE, COMTE DE (1756-1825), French naturalist, was curator of natural history in the Jardin du Roi at Paris, and, later, professor of natural history in the Jardin des Plantes and at the University of Paris. He continued Buffon's *Histoire Naturelle* in his *Histoire des Quadrupèdes ovipares et des Serpents* (1788-9) and *Histoire des Reptiles* (1789-90), and also wrote on fishes, cetaceans, and the natural history of man, as well as a *Histoire Générale de l'Europe* (18 vols. published posthumously, 1826), and *La Poétique de la Musique* (1785). A collected edition of his works on natural history was published by Desmarest (1826-33).

Lacerta (the lizard), a small constellation placed by Hevelius, in 1690, between Cepheus and Pegasus. The *lucida* is a Sirian star of 3.9 magnitude; 6 Lacertæ is a spectroscopic binary.

Lacertidæ, a family of lizards of which the type genus is *Lacerta*. See LIZARDS.

Lacewing Flies are members of the order Neuroptera, remarkable for their delicate wings and brilliant eyes. Stephens enumerates four genera as having British representatives, one of these being the golden-eyed fly.

Lachaise, FRANÇOIS D'AIX DE (1624-1709), French Jesuit, born of a noble family at Château d'Aix, in the department Loire. He was already French provincial of his order when, on the death of Ferrier, he was chosen by Louis XIV. as his confessor (1674), a post he held till his death. His position was one of great delicacy, but he exercised his power with justice, wisdom, and moderation. Père Lachaise opposed Madame de Montespan, and induced Louis to legalize his marriage with Madame de Maintenon. Lachaise founded the College of Clermont. His garden was, in 1804, converted into a cemetery, which is known as Père Lachaise. See Voltaire's *Siècle de Louis XIV.* (1751); Auray's *Cimetière de Père Lachaise*; and Chantelauze's *Le Père de Lachaise* (1859).

La Chaussée, PIERRE CLAUDE NIVELLE DE (1692-1754), French dramatist and friend of Voltaire, is often cited as the originator of the 'comédie larmoyante,' from which the modern French drama took its origin. He was over forty before his first play, *La Fausse Antipathie* (1734), was produced. This was followed two years later by *Le Préjugé à la Mode*, a success which was the means of his election to the French Academy in 1736. Of his other plays the chief are *L'Ecole des Amis* (1737), *Mélanide* (1741), *Amour pour Amour* (1742), *L'Ecole*

des Mères (1745), *La Gouvernante* (1747), and *L'Ecole de la Jeunesse* (1748). He was also the author of a number of *Contes* in verse. His *Œuvres Complètes* were published in 1762 in five volumes. See also Uthoff's *P. de la Chaussée's Leben und Werke* (1885).

Lachenalias, or CAPE COWSLIPS (named after Wernerus de la Chenal of Switzerland, an eminent botanist), are S. African bulbous plants belonging to the order Liliaceæ. They produce two thickish radical leaves and tubular flowers, generally pendulous from erect flower-stems. The only two species commonly cultivated are *L. tricolor*, with purple, green, and yellow flowers, and *L. pendula*, the largest of all lachenalias. Early in August about six bulbs should be planted, half an inch below the surface, in five-inch pots of well-drained compost composed of four parts loam, one part leaf-mould, half a part dried cow manure, and half a part road grit.

Laches. In England it is a principle of equity that it will only help the vigilant, and not those who sleep on their rights. Thus, where there has been a needless delay, or 'laches,' in prosecuting an equitable claim, equity takes away the remedy: e.g., equity will not restrain a man from completing a house at the suit of a plaintiff who has taken no action till it was half finished. See also ACQUESCENCE; LIMITATION, STATUTES OF.

Lachesis. See MOIRÆ.

Lachine, tn., Jacques Cartier co., Montreal Island, Quebec, Canada, 8 m. s.w. of Montreal, on Lake St. Louis, and at the head of Lachine Rapids, which are usually navigated by steamers on the seaward trip. "Shooting" these rapids is a tourist excitement, unattended, in the case of large steamers, by any special danger. The rapids supply electric power for Montreal. **LACHINE CANAL**, which was constructed to avoid the rapids, connects the town with Montreal, and is the main highway of commerce. The name La Chine was given in derision of certain early explorers who, setting out for China by way of the St. Lawrence, got no further than the site of the present town. Pop. (1901) 5,561.

Lachish (Josh. 10:3, etc.), a Philistine city, noticed on monuments about 1500 B.C., as taken by the Abiri. The site is a large mound at Tell el-Hesi, near the hills, 16 m. E. of Gaza. Eight cities were excavated one above the other, and remains of early date were discovered, including seals of the Pharaohs about 1500 B.C., flint instruments, pottery, etc., with a clay tablet of cuneiform writing—a letter from Zim-

ridi of Lachish, who was killed by the Abiri. An Assyrian bas-relief represents Sennacherib on his throne before Lachish in 702 B.C. (2 Kings 19:8). The town was still inhabited after the captivity (Neh. 11:30), but is now deserted. See Petrie's *Tell el-Hesi* (1891); Bliss's *A Mound of Many Cities* (1894).

Lachlan, or CALARE, riv., New South Wales, Australia, rises in the Blue Mts., 120 m. s.w. of Sydney, and flows N.W., w., and s.w. to join the Murrumbidgee 40 m. from its confluence with the Murray. It is about 500 m. long, and is navigable only in rainy seasons.

Liedhmann, KARL KONRAD FRIEDRICH WILHELM (1793-1851), German critic and philologist, born at Brunswick; served in the war of Independence (1813); lectured at Königsberg; and became professor in Berlin University (1827). He published excellent critical essays on Homer and the 'Nibelungenlied,' and between 1829 and 1850 edited the works of Catullus, Tibullus, Terence, Propertius, Babrius, and Lucretius. His small edition of the Greek Testament appeared in 1831, and the large edition, with the Vulgate, in 1846 and 1850. *Lucretius* (1850) was his last and perhaps his greatest work. See Hertz's *Karl Liedhmann* (1851); Grimm's *Rede auf Liedhmann* (in Grimm's *Kleine Schriften*, 1864); and Leo's *Rede zur Säcularfeier Karl Liedhmanns* (1893).

Lachrymal Glands and Duct. See WEEPING.

Lachute, tn. in Argenteuil co., Quebec, Canada, on the North R., 44 m. W.N.W. of Montreal; has grist and paper mills, and exports dairy produce. Pop. (1901) 2,022.

Lacinium, promontory in S. Italy, in the district anciently called Bruttium, now Calabria, a few miles s. of the site of the ancient city of Crotona. On it stood in ancient days a famous temple of Hera Lacinia, the ruins of which have given to the promontory its modern name of Capo delle Colonne. See Grasse's *Orbis Latinus*.

Lac Insects. See COCCUS INSECTS.

Lackawanna, riv. of Pennsylvania, U.S.A., rises in Susquehanna co., in the N.E. corner of the state, and flows s. and s.w. to join the N. branch of the Susquehanna at Pittston. Its lower valley is rich in anthracite coal. Scranton, Carbondale, and Providence are the largest towns on its banks.

La Condamine, CHARLES MARIE DE (1701-74), French explorer, after a distinguished career in the French army, was sent to Peru with Bouguer and Godin (1735-44) to measure an

arc of the meridian at the equator. During these years he explored a great part of the basin of the Amazons, and introduced india-rubber to Europe. See his *Journal du Voyage fait par Ordre du Roi à l'Equateur* (1751-2).

Laconia, city of New Hampshire, U.S.A., the co. seat of Belknap co., situated near the centre of the state, 100 m. N. of Boston, on the Boston and Maine Ry. It has large cotton factories. Lying between Lakes Winnisquam and Winnepisaukee, it is closely connected with other popular resorts of this lake region. Pop. (1900) 8,042.

ardent disciple. In 1830 he joined Lamennais and Montalembert in founding the short-lived journal called *L'Avenir*. In 1840 he became a Dominican in the Minerva at Rome, assuming the name of Dominique. Thence he returned to France, and for years preached in the Dominican habit at Notre-Dame and in many other French churches, attaining an immense reputation as a pulpit orator, with the result that the Dominicans of France were formed into a regular order, with Lacordaire at their head. His school at Sorreze, in the department of the

le Père Lacordaire (1886). Sainte-Beuve has a brilliant article on Lacordaire in *Les Causeries du Lundi*, i. 208.

Lacquers are of two kinds. (1.) The true Chinese lacquer, prepared from juices of certain trees, which, after purification and admixture with pigments and other substances, forms an almost imperishable varnish. (2.) A transparent varnish used to coat polished metal to improve its colour or prevent its tarnishing. These lacquers are alcoholic solutions of shellac coloured with turmeric, dragon's-blood, gumsandarac, or aniline dye, and



Steamer descending Lachine Rapids.
(Photo by Notman, Montreal.)

Laconia and **LACONICA**. See SPARTA.

Lacordaire, JEAN BAPTISTE HENRI DOMINIQUE (1802-61), the greatest of French pulpit orators, was born in the department of the Côte d'Or. His father having died early, he was brought up by his mother, who was a very devout Catholic. He soon, however, repudiated her religious ideas, and distinguished himself both at Dijon, where he studied law, and at Paris, where he practised it, as a vehement enemy of the church. Suddenly all this changed; and in 1824 he entered Saint Sulpice, and by 1827 was a priest. Soon after this he made the acquaintance of Lamennais, and became his

Tarn, was described by Matthew Arnold in an interesting little book as *A French Eton* (1892). In 1860 he was elected a member of the Academy in the room of De Tocqueville, and was received there by Guizot. This was his last triumph. His health rapidly failed, and he died in November 1861. His life has been several times written—most brilliantly, perhaps, by his friend Montalembert (1862; Eng. trans. 1863). Other *Lives*, in French, are those by Foisset (1870), De Broglie (1889), and D'Haussonville (1895); and, in English, by Dora Greenwell (1867) and H. L. S. Lear (1882). See also *Testament du Père Lacordaire* (1870), and Nicolas's *Etude Historique et Critique sur*

are applied to the slightly-warmed article and dried by heat in order to produce a good surface.

Lacretelle, JEAN CHARLES DOMINIQUE DE (1766-1855), French historian, born at Metz. His *Histoire de France pendant le Dix-huitième Siècle* appeared in 1808. Elected to the Academy (1811), he became its president in 1816. Lacretelle's other important works were *Histoire de la Révolution Française* (1821-6); *Histoire de France depuis la Restauration* (1829-35); *Histoire du Consulat et de l'Empire* (1845-8); *Dix Années d'Epreuves pendant la Révolution* (1842); and *Testament philosophique et littéraire* (1840). He died at Macon.

Lacretelle, PIERRE LOUIS DE (1751 - 1824), brother of the preceding, was a distinguished French jurist, and author of *Mélanges de Jurisprudence* (1779). He became a member of the Legislative Assembly (1791), maintained the rights of the house of Savoy under the empire, and, with Jouy, Constant, and others,

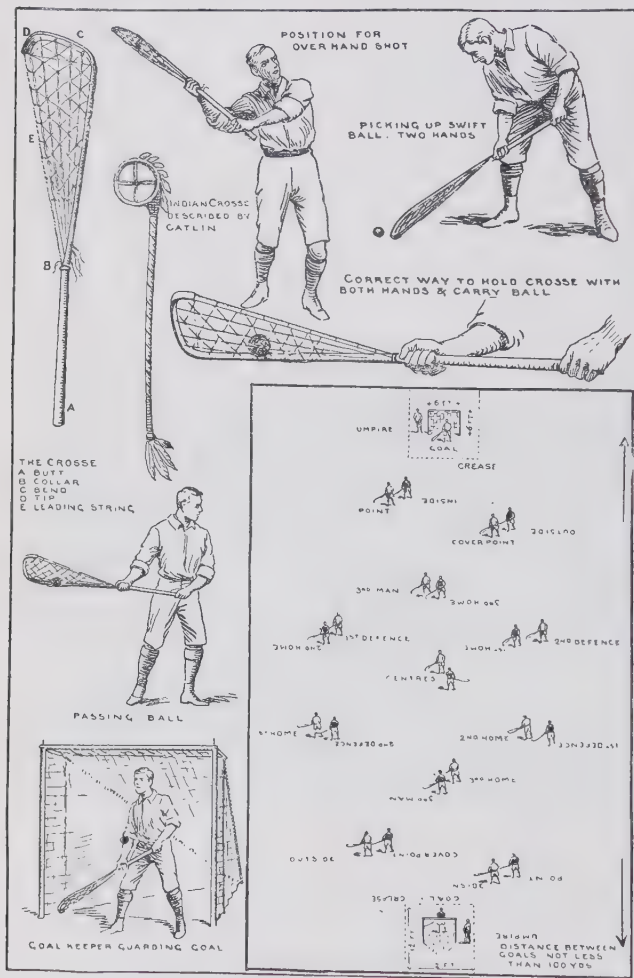
mentaries, histories, and bibliographies. He is best known for his curious compilations on French social life from mediæval to modern times, including *Histoire du XVI^e Siècle en France* (1834-5); *Histoire de la Ville de Soissons* (1837-8); *Le Moyen Age de la Renaissance* (1847-52); *Histoire politique, anecdotique, et*

calculus. Among his works are *Traité du Calcul Différentiel et du Calcul Intégral* (1797-1800); *Traité des Différences et des Séries* (1800); *Traité Élémentaire du Calcul des Probabilités* (1816); and *Cours des Mathématiques* (1796-1816).

Lacroma, islet in Dalmatia, Austria, 1 m. s. of Ragusa, a favourite residence of the Archduke Maximilian, afterwards emperor of Mexico, and of the Crown Prince Rudolph. Richard Cœur-de-Lion, on his return from the crusades in 1192, landed here.

La Crosse, city of Wisconsin, U.S.A., the co. seat of La Crosse co., situated in the w. part of the state, on the Mississippi R., about 160 m. S.E. of St. Paul. In the vicinity are extensive forests of pine and hardwood, and the town is a dépôt for a large part of the N.W.; manufactures lumber. Pop. (1900) 28,895.

Lacrosse. Although played in the United Kingdom, in Australia, and the United States, it is in Canada only that lacrosse has outdistanced all other games. The field of play is similar to that of football, and the object is the same—i.e. to drive a ball between goal posts. The instrument used for this purpose is a 'crosse.' It is a strong stick like that used in hockey, but from the curved end there is stretched a net to a point near the handle. In this net the ball may be caught and carried, and from it the ball may be thrown to a distance of 150 yards. The ball authorized by the Canadian Amateur Union is of india-rubber 'sponge,' not less than $7\frac{1}{2}$ nor more than 8 inches in circumference, and from $4\frac{1}{2}$ to 5 ounces in weight. In matches this ball is furnished by the home club, and the referee sees that a new ball is used for each match. The goal posts consist of two upright poles 5 feet apart and 6 feet in height. The goals are placed at least 120 yards from each other, and, as in association football, a net is attached to the goal posts. The topbar is straight and of iron. A full team consists of twelve players, who are designated as follows: Goal-keeper (who defends the goal); point (first man from the goal); cover-point (in front of point); first, second, and third defence field (ranging down the field almost to the centre); centre (who faces—i.e. begins the game with his opposing centre in the middle of the field); third, second, and first home field (ranging along the field towards the opponents' goal); and the two remaining players who are nearest the opposite goal are called 'outside home' and 'inside home.' The opposing players are thus paired off, so that, no matter what part of the field the ball reaches, there are two rival players eager to secure possession of it.



The Game of Lacrosse.

founded the *Minerve Française* (1818). He also wrote *Œuvres diverses* (1802-7); *Fragments politiques et littéraires* (1817); and *Portraits et Tableaux* (1817).

Lacroix, PAUL (1806 - 84), French antiquary, bibliographer, and writer, born at Paris. Under the name of 'P. L. Jacob, Bibliophile,' he published over eighty romances, besides plays, com-

populaire de Napoléon III. (1853). Lacroix was custodian of the Bibliothèque de l'Arsenal, Paris, from 1855 until his death.

Lacroix, SYLVESTRE FRANÇOIS (1765-1843), French mathematician, born in Paris, and occupied the mathematical chair at the Collège de France (1815-43). He introduced the simple notation now employed in the integral

There are two umpires, one at each goal, either mutually agreed upon by the opposing captains or appointed by the referee. The ball is laid upon the ground between the crosses of the two opposing centres, and when both sides are ready the referee calls 'play,' and the struggle begins for the possession of the ball. A player is not allowed to handle the ball, the only exception to this being in the case of a goal-keeper while standing within the confine of the goal crease—i.e. an oblong space, 15 by 17 ft., laid out as follows: 9 ft. behind and 6 ft. on either side of the goal post. The goal-keeper, if in this crease, may put away with his hand or block the ball in any way with his crosse or body. The match is won by the club which forces the ball the greater number of times through the goals from the front side in an hour and a half. In the spring of 1902 the Toronto Lacrosse Club sent a team of fifteen players across the Atlantic to play the representative clubs of England and Ireland. The series of matches resulting did a great deal to popularize the game in the United Kingdom. The committee of the M.C.C. some time ago adopted lacrosse as its winter pastime, with headquarters at Lord's. Authorities: 'National Amateur Lacrosse Union's Constitution and By-Laws,' A. J. Pittaway, president, Ottawa, Canada; Catlin's works; Parkman's *History of the Conspiracy of Pontiac* (1851); and the Marquis of Lorne's *Canadian Pictures* (1885).

Lacryma Christi, a famous Italian wine made from a special Muscat grape grown on the farms of the monastery Lacryma Christi ('Tear of Christ'), which is situated on the lower slopes of Mt. Vesuvius. The grapes are also used as table raisins. Two varieties of the wine are produced, and only in small quantities. The light-coloured or white possesses a fine, sharp flavour, and a sweet and excellent bouquet; the red variety is somewhat inferior. Much of the Lacryma Christi of commerce is a second-rate wine coming from Istria, Capua, Nola, Pozzuoli, Cyprus, and the Grecian islands.

Lactantius, LUCIUS CÆLIUS FIRMIANUS (or L. CÆCILIUS LACTANTIUS FIRMIANUS), a Christian apologist of the 4th century; was a pupil of Arnobius, and at first a rhetoric an in Nicomedia. Having become a Christian, he wrote several theological treatises, and afterwards (313 A.D.) became tutor to Crispus, son of the Emperor Constantine. He died c. 330. His chief works are *Divinarum Institutionum Libri VII.* an apologetic and polemical introduction to Christianity; treatises on the

'handiwork' and the 'wrath' of God (*De Opificio Dei, De Ira Dei*); and a historical work, *De Mortibus Persecutorum*, in which he seeks to trace the judgments of God in the events of his time. See his works in *Ante-Nicene Christian Library*; Dissertations in Migne's *Patrologia Latina*, vi., vii.; J. H. B. Mountain's *Summary of the Writings of Lactantius* (1839).

Lactation. See BREAST.

Lacteals, the lymphatic vessels which convey chyle collected from the mucous membrane of the small intestine to the thoracic duct. They derive their name from the milky appearance of their contents after a full meal. They then carry lymph together with digested fat in small globules and characteristic granules.

Lactic Acid, α -hydroxypropionic acid ($\text{CH}_3\text{CHOHCOOH}$), is a mixture of two stereo-isomeric monobasic acids that differ principally in their action on polarized light, and can be separated by the crystallization of their cinchonine salts or the action of moulds. It is produced by the action of the lactic bacillus in the fermentation of sugars and similar bodies, and is thus formed on the souring of milk. It also occurs in gastric juice and in the residue left on distilling fermented liquors. Cane sugar is the usual source, and is fermented in a slightly warm solution in the presence of sour milk, decaying cheese, and chalk, the latter substance being added to neutralize the free acid, which otherwise would soon stop the action of the organism. Lactic acid is set free by the action of sulphuric acid on the calcium lactate obtained, and forms a thick, very sour syrup (sp. gr. 1.2) that mixes with water, alcohol, and ether, and forms crystalline salts. Lactic acid, particularly its antimony salt, is used in dyeing and in calico-printing.

Lactometer (called also GALACTOMETER) is a simple form of variable immersion hydrometer, graduated to give a rough indication as to the richness and purity of milk. See HYDROMETER.

Lactose. See MILK SUGAR.

Lactuca is a genus of plants belonging to the order Compositæ. About sixty species are known. They are mostly natives of temperate regions, the most important species being *L. sativa*, the common lettuce. Two or three species are grown in gardens as ornamental plants, and are of easy culture in any deeply-dug loam. *L. tuberosa*, which produces loose panicles of pale-blue flowers in autumn, *L. alpina*, a much larger plant, bearing clusters of purple flowers in summer, and *L. macrorrhiza*, are the favourites.

Lacy, PETER or PIERCE, COUNT (1678-1751), Russian soldier, was born at Killeedy, Co. Limerick. When only thirteen he served James II. at the defence of Limerick; left Ireland in 1692, and at Brest joined the Irish Brigade. After the peace of Ryswick he entered the Russian service; led a brigade at Pultowa; drove Marshal Saxe from Courland; became a field-marshal, and defeated the Poles (1735) and the Turks (1736). Lacy also commanded the Russian sea forces against Sweden. He was the real reformer of the Russian army, as his younger son, Field-Marshal Maurice Lacy (1725-1801), was of the army of Austria. The elder Lacy, styled by Frederick the Great 'the Prince Eugene of Moscow,' died governor of Livonia. See D'Alton's *Army Lists* and O'Callaghan's *History of the Irish Brigades* (1854).

Lacy, WALTER (1809-98), actor, born in Midlothian, his proper patronymic being Williams; first appeared at Edinburgh (1829) as Montalban in the *Honeymoon*, and acquired a high reputation for light comedy. He played for a time with Charles Kean, and was the original Roubin in Boucault's *Prima Donna*, St. Evrémont in *A Tale of Two Cities*, and Bellingham in *After Dark*.

Ladakh, the E. prov. of Kashmir, is bounded on the N. by the Karakoram Mts., and on the E. by Tibet. The province is traversed from E. to W. by a series of heights which link the Kuen-lun range with the Himalayas. The chief river is the Indus, which flows through a picturesque valley formed by two well-defined spurs of the Himalayas. Gold, copper, iron, salt, borax, and sulphur are found in the province. Ladakh is a wild, mountainous province, inhabited by a race distinctly Tibetan. Originally a part of Tibet, the province was afterwards independent until 1830, when it was annexed to Kashmir. Cap. Leh. Pop. about 30,000.

Ladas, the name of two famous ancient Greek athletes. One a native of Laconia (or of Argos, as his statue stood in Apollo's temple there), won the long race at Olympia, but was afterwards taken ill, and expired on his way home, about five miles from Sparta. His date is unknown. There was a famous statue of him by Myron, and as Myron flourished about 430 B.C., Ladas must have lived about that time. The other was of Ægium in Achaia, and won the short race at Olympia in 280 B.C. Pausanias is our authority for these athletes, and the Roman poets Catullus, Juvenal, and Martial mention a Ladas as proverbial for his speed.

Ladd, GEORGE TRUMBULL (1842), American theologian and psychologist, born at Painesville, Ohio; was a Congregational minister at Milwaukee (1871-9); professor of intellectual and moral philosophy at Bowdoin College, and lecturer on church polity and systematic theology at Andover (1879-81); and was elected to the chair of philosophy at Yale (1881). Among his works are *Principles of Church Polity* (1881), *Elements of Physiological Psychology* (1887), *Introduction to Philosophy* (1891), *Psychology, Descriptive and Explanatory* (1894), *Philosophy of Mind* (1895), *Philosophy of Knowledge* (1897), and *Philosophy of Conduct* (1902).

Lade, isl. off the w. coast of Caria in Asia Minor, opposite to Miletus. It is famous in history as the scene of the sea-battle by which the Persians put an end to the Ionian revolt in 494 B.C.

Lading. See BILL OF LADING.

Ladin Language. This tongue is spoken in the Engadine (Swiss portion of the Upper Inn valley), as well as in certain districts of S. Tyrol. It is a romance language, which has lagged behind its sisters, French, Italian, and Spanish, and is described by the first writers who mention it (in the 16th century) as a Lombard dialect. The earliest written document in the Engadine form of Ladin is a poem dated 1527 (published in 1865), and written by Johann von Travers. In 1900 the Ladin language speakers of the Engadine numbered 5,006 out of a population of 6,275.

Lado, station, Bari country, E. Sudan, on the l. bk. of the White Nile, was founded by General Gordon in 1875, and, before the Mahdi rising, was capital of the Equatorial Province.

Ladoga, LAKE (also called 'Nevo'), largest lake in Russia and in Europe, covering an area of more than 6,900 sq. m., with an extreme length of over 125 m. (N. to S.), and a mean breadth of 62 m. (E. to W.), lying between 60° and 61° N. lat., and cut about the middle by the 31st degree of E. long. The S.W. corner of the lake is 23 m. from the Gulf of Finland, the shores and water belonging partly to the Russian governments of St. Petersburg and Olonetz, and partly to the province of Viborg in Finland. It has three principal tributary rivers—(1) the Voksa or Wuoxen, entering the lake on the W. from Lake Saima; (2) the Svir, flowing in on the E. from Lake Onega, and properly an upper course of the Neva; and (3) the Volkhov, debouching on the S. from Lake Ilmen and Old Novgorod. The coast-line of the W. and N. is

often rocky; on the S. and E. it is generally low, sandy, or marshy. The greatest ascertained depth is over 700 ft., while the mean depth is about 300 ft. The water is rich in fish. The chief ports are Kexholm, Serdobol or Sordavala, and Chertova Lakhta. Others are Rekale, opposite Serdobol, Monsinsaari, Lukulansaari, and Tuna. The Ladoga Canal was constructed along the S. shore (1861-6) to secure a safe passage to St. Petersburg in stormy weather. Navigation is open from May to November, but the middle of the lake is sometimes unfrozen the whole year round.

Ladon, in Greek legend, the dragon with a hundred heads which guarded, by Juno's orders, the apples in the gardens of the Hesperides. He was said to have been the offspring of Typhon and Echidna, and never slept. See Hesiod's *Theogonia*, Apollonius Rhodius, and Kingsley's *Heroes* (1856).

Ladrones, or **MARIANNE ISLANDS**, in Pacific Ocean, to the N. of Caroline Is., between 13° and 21° N. and 144° and 146° E., and E. of the Philippines, consist of ten volcanic islands, of which only four are inhabited—*viz.* Agrigan, Anatahan, Alamagan, and Pagan; and five coralline islands—*viz.* Guam, Rota, Agui-gan, Tinian, and Saipan, all of which are inhabited except Agui-gan. The total area is about 250 sq. m. The chief products are maize, coconut, coffee, cocoa, sugar, cotton, and tobacco, while the principal export is copra. All the islands except Guam were purchased by Germany from Spain in 1899, and are administratively part of the German New Guinea Protectorate. The seat of government is on the island of Saipan. Guam (with the only town, Agaña) was occupied by the United States during the Spanish-American war, and by the treaty of 1899 was retained by them. The islands were first discovered by Magellan in 1521, and named Ladrones (Robbers) in allusion to the thievish propensities of their inhabitants. In 1688 the Spaniards obtained possession of the islands. Pop. (1898) 10,938, of which 9,000 belong to Guam.



Ladybird and Larva.

Ladybirds are beetles belonging to the family Coccinellidae, and are of great economic importance because they feed entirely on aphides, scale insects, mites, and similar destructive

forms. They are highly coloured, and exude, when attacked, a fluid of unpleasant smell and taste. The body is rounded, flat below and strongly convex above; the antennæ are short and slightly clubbed; the feet are apparently three-jointed, though a small additional joint is also present. The larvæ live exposed, and may often be seen running over plants in search of the aphides on which they feed. Some forty species of ladybirds occur in Britain; *Coccinella bipunctata* may be mentioned as an example. The seven-spot ladybird is the most common species. All show a remarkable range of colour variation, for which see Bateson's *Materials for the Study of Variation* (1894).

Ladybrand, tn., Orange River Colony, 50 m. E. of Bloemfontein. It was so named after the wife of President Brand. Pop. about 2,000.

Lady Day. Lady Day, or the Feast of the Annunciation, the 25th day of March, is quarter day in England and Ireland.



Lady Fern.
1. Pinnule.

Lady Fern, the popular name of a British fern, *Asplenium Filix-femina*. It is variable in size and detail, of very graceful habit, and of thin, almost transparent texture; and its colour is a most delicate green. The fronds are lanceolate and bipinnate, and are developed from the summit of the caudex. The venation is very distinctly visible on account of the thinness of the texture. Many varieties are found wild, such as *marinum*, whose fronds taper from their centres towards either extremity, *latifolium*, and *convexum*, whose fronds are much narrower than in the common type. The lady fern and its varieties are easily cultivated in any damp, shady spot.

Lady Margaret Hall, college for women, Oxford, was founded in 1878 and opened in 1879. It is established on the principles

of the Church of England, with liberties for other religious bodies. The students, who number fifty-four, are prepared for the examinations of Oxford University, and attend its classes. They must have passed responsions, or a corresponding examination, before admission. There is a resident staff of three women tutors, with a large number of non-resident tutors and lecturers. Fees for board and residence are £75 per annum, besides fees for tuition, which average about £28 per annum. Students are not allowed to reside for less than three academical years without special leave, and are expected to read for honours.

Lady's Mantle is a popular name given to the plants belonging to the genus *Alchemilla*, a subdivision of the Rosaceæ order. They have no petals, the sepals are usually borne in two rows—four in each—and there are four stamens. The common lady's mantle, *A. vulgaris*, is a British plant growing to a height of about a foot. It frequents hilly pasture land, where it may be recognized by its large, reniform, soft leaves, and in late summer by its loose clusters of small greenish flowers. *A. alpina*, chiefly found in Scotland, has leaves which are silvery-white below. *A. arvensis*, the field lady's mantle, has downy, deeply-serrated leaves, and tiny, greenish-yellow flowers.

Lady's Slipper, a popular name given to orchids belonging to the genus *Cypripedium*, especially to the British native species, *C. calceolus*, which is occasionally found in the woods in the north of England. It is a common plant in certain districts of Central Europe and N. Asia. The inflated lip of the corolla has given rise to the popular name.

Ladysmith, the third largest town of Natal, on the Klip R., 80 m. N.W. of Pietermaritzburg, and 190 m. N.W. of Durban. It lies in a hollow surrounded by distant hills. During the South African war it was besieged by the Boers for four months (Nov. 2, 1899, to Feb. 28, 1900), but was stubbornly defended by Sir George White, and finally relieved by the operations of General Buller. Within twelve miles of the town is a productive coal area. Pop., excluding soldiers, about 5,000 (Europeans, 1,800).

Lady's Smock, or CUCKOO-FLOWER, is a popular name given to *Cardamine pratensis*, a common meadow plant bearing pretty pale lilac cruciferous flowers in May. It has pinnate leaves, and the flowers are followed by long pods or siliques, opening by two valves.

Laeken, N.W. suburb of Brussels, Belgium, with a royal palace, built in 1782-4, and in great part rebuilt after a fire in 1890, the usual summer residence of the Belgian royal family, whose burial-place is in the modern church of St. Mary. Noted for its manufacture of carpets. Pop. (1900) 30,438.

Lælia, a genus of tropical American orchids, allied to the genus *Cattleya*, being distinguished therefrom by the possession of eight pollen masses instead of four. They have fleshy oblong leaves, bear flowers of great beauty, and are much valued by gardeners. Their cultivation is similar to that of *Cattleya*. Among the species are *L. Diglyana*, very free-flowering, purple, lilac, and white; *L. harpophylla*, orange, white, and scarlet; *L. purpurata*, crimson and white; *L. albidula*, a sweetly scented species, white, yellow, and pink; *L. anceps*, lilac, very floriferous; and *L. præstans*, a dwarf species, rose and purple.

Lælius. (1.) **GAIUS LÆLIUS** (c. 235 B.C.) was a close friend of Scipio Africanus the elder, whom he assisted both in his Spanish and his African campaign as his lieutenant. Lælius commanded the Roman fleet at the capture of New Carthage in 210 B.C., and at Zama, 202 B.C. He was chosen prætor of Sicily in 196, and consul in 190 B.C. The date of his death is unknown. (2.) **GAIUS LÆLIUS** (c. 186 B.C.), son of the above, was tribune of the plebs (151), prætor (145), and consul (140). But he is known in history less as a man of action than as a leader of culture, and the friend of the philosopher Panætius (who induced him to become a Stoic), the historian Polybius, and the poets Terence (whom he assisted in the composition of his *Comedies*) and Lucilius. From his erudition he got the surname of 'Sapiens' or the 'Philosopher.' He is still more famous for his friendship with Scipio Africanus the younger, which is immortalized in Cicero's *Lælius sive de Amicitia*. He was noted as an orator, and a few titles of his speeches and one fragment are extant. See Mommsen's *Hist. of Rome*; and for the younger Lælius, Cicero's works, especially the *Lælius sive de Amicitia*, and *De Oratore*.

Lénas, the surname of a plebeian family belonging to the Popilian clan in ancient Rome, of which perhaps the most noteworthy member was Gaius Popilius Lénas, who stopped the invasion of Egypt by Antiochus Epiphanes of Syria. He was consul in 172 B.C.

Laënnec, **RENÉ THÉOPHILE HYACINTHE** (1781-1826), French physician, born at Quimper; became an army surgeon (1799), editor of the *Journal de Médecine* (1814), and principal physician to the Hôpital Necker (1816), where he invented the stethoscope, and wrote his *Traité de l'Auscultation Médiate* (1819), which has been translated into many languages. In 1823 Laënnec succeeded Hallé as professor of medicine at the Collège de France, which chair he changed the following year for that of clinical medicine. He died of phthisis. See Bayle's *Encyclopédie* (1834) and Lalour's *Notice Historique sur Laënnec* (1868).

Laertes, in ancient Greek legend king of Ithaca, was the son of Acrisius; husband of Anticlea, and the father of Odysseus. In his youth he took part in the Calydonian hunt and the Argonautic expedition. See Homer's *Odyssey*, xi. 24, and Apollodorus, i. 9.

Laertius, **DIOGENES**. See **DI-OGENES LAERTIUS**.

Læstrygones, in ancient Greek legend, a race of savages and cannibals whom Odysseus encountered in his wanderings. Greek writers placed them on the east coast of Sicily, Roman on the south coast of Latium; but Homer's description of the land as one 'where a sleepless man might earn a double wage, for night each other are the courses of day and night,' implies that, if there is any real basis to his fiction, it is some sailor's story of the far north with its long days and short nights. See Homer's *Odyssey*.

Lafarge, **JOHN** (1835), American painter, born in New York; studied under Couture in Paris, and W. M. Hunt. He devoted himself to mural decoration, and to the development of the art of stained glass, changing and reforming the methods of preparing and painting the glass. His best work may be seen in churches in Washington, New York, Boston, Cleveland, and Philadelphia. He is the author of *Considerations on Painting* (1898), and *An Artist's Letters from Japan* (1897).

La Farina, **GIUSEPPE** (1815-63), Italian author and politician, born at Messina. In 1848 he established *L'Alba*, a democratic journal, advocating Italian unity and freedom. In the Parliament of 1849 he was successively minister of public instruction, public works, and of the interior; but through his opposition to Ferdinand, he was compelled to take refuge in France. Among his works are *Istoria della Rivoluzione Siciliana* (1853), *Sulle presenti Condizioni d'Italia* (1860). His *Scritti politici* (1870) and his *Epistolario* (1869) were edited by Franchi.

Lafayette, city of Indiana, U.S.A., cap. of Tippecanoe co., situated in the w. part of the state, on the Wabash R., 130 m. S.E. of Chicago, and is on four lines of railway. Manufactures soap, machinery, farming implements, cars and wagons, and has lumber mills. Pop. (1900) 18,116.

Lafayette, MARIE JEAN PAUL ROCH YVES GILBERT MOTIER, MARQUIS DE (1757-1834), French soldier and statesman, was born at the castle of Chavagnac in Auvergne. He married and entered the army at an early age. In 1777 he assisted the American colonists in their war with England. His military knowledge and that of other French soldiers was of great value. Lafayette, who commanded a division in America, was present at Yorktown (1782), and was publicly thanked by Washington for his services. During the war he imbibed republican views, and in the early days of the French revolution led the minority of the nobility in the States-General to join the Tiers-Etat (June 25, 1789). After the fall of the Bastille on July 14, Lafayette became commander-in-chief of the National Guard. Throughout 1790 he let things drift, with the result that on the Champ de Mars in 1791 he was forced to fire upon the mob. Thenceforward he was hated by the Jacobins and distrusted by the royalists. On the outbreak of the war with Austria in 1792 he was placed in command of an army on the frontier. After the overthrow of the monarchy on Aug. 10, 1792, in endeavouring to escape across the frontier he was captured by the Austrians, who imprisoned him for five years. On the restoration of the monarchy in 1815 he became a prominent supporter of liberal ideas, and was the acknowledged leader in the revolution of 1830, when he commanded the National Guards. In 1824 the American Congress granted him a large sum of money and an estate. See Lafayette's *Mémoires, Correspondance et Manuscrits* (1837-40), La Bédollière's *Vie politique du Marquis de La Fayette* (1835), H. Morse Stephens's *History of the French Revolution* (1886-91), Tuckerman's *Life of Lafayette* (1889), Charavay's *Le Général La Fayette* (1895), and Tower's *The Marquis de La Fayette in the American Revolution* (1895).

Lafayette, MARIE MADRELINE PROCE DE LA VERGNE, COMTESSE DE (1634-93), French novelist, was born at the castle of Chavagnac, Auvergne. She was known in the circles of 'Les Precieuses' under the name of Feliciane. Like Madame de Sévigné, she proved herself a brilliant letter writer; and through her novels, *Zayde* (1670)

and *La Princesse de Clèves* (1678), anticipated the modern novel. She also wrote a *Histoire de Henriette d'Angleterre* (posthumously published 1720), and *Mémoires de la Cour de France pour les Années 1688 et 1689* (1731). Her *Œuvres*, with the observations of Delandine, were published in 8 vols. (1786); *Œuvres Complètes*, in 5 vols. (1812); *Lettres*, by L. S. Auger (1823); and *Mémoires*, ed. by Asse (1890). See Sainte-Beuve's *Portraits des Femmes*, and D'Haussonville's *Madame de La Fayette* (1891).

Lafitte, JACQUES (1767-1844), French politician and banker, born at Bayonne; was governor of the Bank of France (1814). He financed the second revolution, and became prime minister under Louis Philippe (1830-1). Ferrevently democratic, Lafitte refused all titles, and his political expenditure having ruined him, a national subscription was raised (1837), with which he started a new bank—'Banque Sociale.' See *Souvenirs de Jacques Lafitte, racontés par lui-même*, but written by C. Marchal (1844).

Lafitte, PIERRE (1823-1903), French positivist, was born at Beguery (Gironde). In Paris he became the friend and disciple of Comte. His works include *Les Grands Types de l'Humanité* (1874) and *Cours de Philosophie Première* (1889-95).

Lafitau, JOSEPH FRANÇOIS, (1670-1740), French Jesuit missionary and author, born at Bordeaux; was for some years a Jesuit missionary among the Canadian Indians; and wrote *Mœurs des Sauvages comparées aux Mœurs des Premiers Temps* (1723); *Histoire des Découvertes et des Conquêtes des Portugais dans le Nouveau Monde* (1735). See La Chaussée's *Les Deux Lafitau* (1821).

La Fontaine, JEAN DE (1621-95), French poet and fabulist, born at Château-Thierry, Champagne, where his father was forger to the Duc de Bouillon; was educated for the church, which he abandoned for law, and subsequently for a rangership of the duchy of Château-Thierry. From domestic worries he sought solace in literary labours. His talents soon became recognized, and for some time he resided alternately at Paris, where he found a patron in Fouquet, and at his native place, where the Duke and Duchess of Bouillon held him in much esteem. The first book of his *Contes* (Tales)—1664—won popularity, and secured for him the favour of Molière, Racine, and Boileau. With them he formed the famous quartette of the 'Rue du Vieux Colomier,' the self-appointed dictators of literary taste, and the sole repre-

sentatives, according to La Fontaine, of French letters. In 1672 he was invited to make his home in the household of Madame de la Sablière, one of the leaders of the most brilliant and intellectual coteries in the capital, where he resided till her death, in 1692. Meantime he augmented his fame by the publication of the second book of his *Contes* and of the first six books of his inimitable *Fables* (1668), the final portion of the latter being issued in 1678. His reputation was now at its height, and in 1684 he was elected to the Academy. His *Fables* have been translated into almost every European language. The standard editions of his *Œuvres Diverses* are those of Walckenaer (1826), and the edition in the series entitled *Les grands Ecrivains de la France* (1833). One of the best biographies of La Fontaine will be found in the *Nouvelle Biographie Générale*. See also Racine's *Mémoires*, La Harpe's *Eloge de La Fontaine*, Sainte-Beuve's *Portraits Littéraires*, Taine's *Essai sur les Fables de La Fontaine*, Walckenaer's *Histoire de la Vie et des Œuvres de La Fontaine*, Saint-Marc Girardin's *La Fontaine et les Fabulistes*, Lafenestre's *La Fontaine*, Gruber's *Lafontaines Leben und Wirken*, and Collins's *La Fontaine and other French Fabulists* (1832).

Lafontaine, SIR LOUIS HYPOLITE (1807-64), Canadian statesman, born at Boucherville, Lower Canada; became leader of the French party in the Canadian Parliament. He became attorney-general and member of Executive Council (1842-4), and after Baldwin's resignation premier of Canada (1848-51). He was the first person of French-Canadian extraction who held the highest legal offices in Lower Canada after it became a part of the British empire. See Dent's *Canadian Portrait Gallery* (1881); David's *Sir L. H. Lafontaine* (1872).

Lafuente, MODESTO (1806-66), Spanish satirist, journalist, poet, and historian. Under the names of 'Fray Gerundio' and 'Tirabecque' he wrote a number of satirical articles and sketches, which were very popular (1838-46); but he is now best known by his voluminous *Historia General de España* (1850-67), which, although written from a strongly partisan (Liberal) standpoint, is a standard work on the subject.

Lagarde, PAUL ANTHON DE (1827-91), famous Orientalist, born at Berlin; was a teacher there (1855-66), and in 1869 became professor of Oriental languages in Göttingen. A list of his works, remarkable not only for their number and variety

(showing expert knowledge of some ten languages), but also for their accuracy and erudition, is given in Lichtenberger's *History of German Theology in the 19th Century* (trans. 1889). See Anna de Lagarde's *Paul de Lagarde, Erinnerungen aus seinem Leben* (1894).

Lagden, SIR GODFREY YEATMAN (1851), British commissioner for native affairs in S. Africa since 1901, a native of Cambridgeshire; was successively secretary to the Transvaal Protectorate (1878); colonial secretary, Sierra Leone (1883); resident commissioner of Basutoland (1885); British commissioner, Swaziland (1892); and commissioner for native affairs, and member of Council, in the Transvaal (1901). During the late Boer war his influence helped greatly to retain the loyalty of the Basutos.

Lagenaria, a genus belonging to the order Cucurbitaceae, with only one species, *L. vulgaris*, the bottle-gourd, which is a native of India, the Moluccas, and Abyssinia. It bears large white flowers, followed by the curiously-shaped fruits whence the plant derives its popular name.

Lager, a class of beer prepared and consumed in nearly all parts of the world. It is obtained by the decoction and bottom-fermentation system. The alcoholic strength is about four per cent. See BREWING.

Lagerlöf, PETRUS (1648-99), Swedish scholar, became professor of logic at Upsala (1682), of poetry (1684), and of elocution (1687), and royal historiographer (1695). His poems, both in Latin (*Carmina*) and in Swedish, were much appreciated by his contemporaries.

Lagerlöf, SELMA (1858), eminent Swedish novelist and leader of the modern romantic reaction in Sweden; won an instantaneous popularity by the publication of her *Gösta Berlings Saga* (1891; Eng. trans. 1898), a modern treatment of old legends with a mystical undercurrent and an idealistic aim. It was surpassed by *Antikrists Mirakler* (1897; Eng. trans. 1899), an eloquent plea for Christian socialism. Her other works include *En Herrgardsägg* (1899), *Drottningar i Kungahälla* (1899; trans. 1901).

Lagerstroemia, a genus of tropical and subtropical trees and shrubs belonging to the order Lythriaceae. The Chinese *L. indica*, the crane myrtle, is largely cultivated in the southern states of America, where it grows as a hardy plant. The only other species commonly grown is *L. Flores-Reignee*.

Lagoa dos Patos, coast lagoon, Rio Grande do Sul, Brazil, receives the river Jacuhy at its N.

extremity, and is connected with Lagoa Mirim by the Rio S. Gonzal and the Atlantic by a channel on which stands Rio Grande do Sul. Area 3,000 sq. m.

Lago Maggiore. See MAGGIORE.

Lagomys, the genus to which belong the Pica, or tailless hares.

Lagoon, a basin of water, salt, brackish, or fresh, cut off from the sea, with which it may or may not be in actual communication. Lagoons are generally shallow, and they may be grouped into (1) the central or fringing lagoon of a coral island; (2) deltaic lagoons (see DELTA); and (3) the sand-bordered lagoons of the coast, which are usually elongated and parallel to the coast. Lagoons formed of a sand-barred estuary, such as those of the N.

timated population of 1,500,000, of whom about 300 are Europeans. The colony consists of Lagos I. (3½ m.) and a strip of land along the coast of about 140 m., between French Dahomey and S. Nigeria, and has an area of 3,460 sq. m. The protectorate extends N. beyond the Yoruba country to the French possessions on the Middle Niger, within the limits defined by the Order in Council of December 27, 1899. The interior is hilly; there are no important rivers. The soil is generally fertile, the principal products being palm oil, cotton, kola nuts, mahogany, rubber, ivory, gum, and cocoa. The imports in 1903-4 amounted to £816,317 (from Britain £628,564), and the exports to £1,019,054 (to Britain £295,525). The revenue in



Lagos.

Black Sea or S. Devon coast, are termed limans. The coastal lagoons are formed by the growth of a current-caused sand spit extending across any inlet and in time almost cutting it off from the sea. Such lagoons are the haven of the Baltic and the étangs of the S. of France, where the transition to the deltaic lagoon can be examined, as also those in the Gulf of Mexico and the E. shores of the United States S. of Cape Hatteras.

Lagos. (1.) Territory of W. Africa, comprising, according to an Order in Council of July 24, 1901, the colony proper and the protectorate. It is bounded on the N. and E. by British Nigeria, on the S. by the Gulf of Guinea, and on the W. by French Dahomey. Area, 28,910 sq. m.; an es-

penditure £334,695, and the expenditure £303,085. The inhabitants are chiefly engaged in trading and agriculture. The climate is exceedingly unhealthy, especially for Europeans. Government telegraph lines have been laid to Jebba and Wushishi on the Niger, and a cable connects the territory with England. The railway from Lagos to Ibadan (126 m.) has a branch to Abeokuta. The colony became British in 1861. (2.) Chief town of above, on Ogun R., with the only natural harbour to be found on this coast for a distance of 1,000 m. It is accessible to vessels drawing about 10 ft. of water. The Bank of British West Africa started business in Lagos in 1891 as the African Banking Corporation. Pop. (1901) 41,847, of whom 233

were Europeans. (3.) Seaport, Algarve prov., Portugal, 30 m. N.E. of Cape St. Vincent; has a fine and well-sheltered harbour. There are important tunny fisheries. Pop. (1900) 8,268. (4.) Town, Jalisco state, Mexico, 15 m. N.W. of Guanajuato, is frequently called Lagos de Moreno, from its defender, Pedro Moreno, who was killed in battle with the Spaniards in 1817. Pop. 14,000.

Lagos, **BATTLE OFF**, a naval fight (Aug. 18, 1759) between the French under De la Clue and the British under Boscawen, in which the latter were victorious.

Lagrange, **JOSEPH LOUIS**, COMTE (1736-1813), French mathematician, born at Turin. After he had been professor at Turin, Frederick the Great appointed him to succeed Euler as director of the Berlin Academy, a post he held for twenty years. In Berlin Lagrange published many original dissertations on applications of the higher mathematics. Among the most important results obtained by him is the law, given in his *Variations of the Elliptic Elements*, that the action and reaction of all the planets in our system can only produce *periodic* changes, the general equilibrium, therefore, remaining permanently stable. Before going to Berlin he had completed his *Calcul des Variations* (1762), and after his return to Paris he published his great work, the *Mécanique Analytique* (1788). Ten years later appeared the *Théorie des Fonctions Analytiques* (1797). On his death he was buried in the Panthéon. All Lagrange's works are stamped by originality, power, and elegance. Each of his treatises marks an epoch in the history of mathematics pure and applied, and most of the great developments of last century find their source in Lagrange. His *Mécanique Analytique*, though based with doubtful logic on the principle of virtual velocities, is a work of the highest genius. It unifies Newtonian dynamics as a magnificent system of analysis, developing methods and processes the power and significance of which are not yet fully understood. See *Eloge de Lagrange* (*Mém. de l'Institut pour 1812*); Virey et Potel's *Précis historique sur la Vie et la Mort de Lagrange* (1813); Cossali's *Eloge de Lagrange* (1813). An excellent edition of his works, *Œuvres Complètes de Lagrange*, edited by Serret and Darboux, was published in 14 vols. (1867-92).

La Grita, or **GRITA**, tn., state of Los Andes, Venezuela, S. America, on riv. Grita, 60 m. S.W. of Merida; has extensive coffee, tobacco, and sugar plantations. Pop. 10,500.

La Guayra, chief port of Venezuela, 10 m. from Carácas. The harbour has been protected by large breakwaters, which enclose an area of 80 ac. The climate is excessively hot; mean temp. 83° F. Coffee, cocoa, and hides are exported. In 1903 the fort was bombarded by the British and German fleets to enforce the settlement of claims against the government of Venezuela. Pop. 14,000.

Laguna, (1.) Province, Luzon, Philippines, at the E. of Manila Bay. The chief products are sugar, corn, rice, coffee, and coconuts. Area, 752 sq. m. Pop. (1900) 177,000. Cap. Santa Cruz. (2.) Town, isl. of Tenerife, Canaries, on N. shore, near Santa Cruz; was formerly the capital of the Canaries. Produces oranges, raisins, wheat, and tobacco. Pop. (1900) 13,152. (3.) Small port in Santa Catharina, Brazil, on a lagoon 75 m. S. of Florianopolis; terminus of Santa Catharina Ry. Rich coal fields in the neighbourhood.

Lagunaria, a genus of evergreen tropical Australasian trees belonging to the order Malvaceæ. *L. Patersonii* is sometimes grown under glass in this country. It has long, ovate leaves with entire margins, and bears large, rose-coloured flowers similar to those of Hibiscus.

Lagurus, or **HARE'S-TAIL GRASS**, a genus of grasses containing only one species, *L. ovatus*, a native of the southern coast regions of Europe. It is a half-hardy annual plant, well worth cultivation.

La Habana, prov. of Cuba, W. Indies, crossing the W. part of the island from the Gulf of Mexico to the Caribbean Sea. Area, including the Isle of Pines, 2,772 sq. m. The forests are valuable. Cigars and cigarettes are manufactured. Pop. (1900) 424,804. Cap. Havana.

La Hague. See **HAGUE**.

La Halle, **ADAM DE** (c. 1240-c. 87), French poet and dramatist, nicknamed 'the Hunchback of Arras,' is accounted the pioneer of French drama, because of his *jeux*, or *masques*, chief of which are the *Jeu de la Feuillée*, the *Jeu de Robin et Marion* (the latter derived from the legend of Robin Hood), and a poem, the *Congé*. His *Œuvres Complètes* were published by Coussemaker (1872), and his *Chansons* by Berger (1900). See *Life* by Guy (1898).

La Harpe, **JEAN FRANÇOIS DE** (1738-1803), French poet and critic, was born in Paris. In 1763 he achieved popularity with *Warwick*, a tragedy; but his later dramatic works, including *Timoléon* (1764), *Pharamond* (1765), *Jean de Naples* (1781), and *Coriolan* (1784), were all more or less

failures. His best work, *Cours de Littérature* (1799-1805), is still of value as a critical history of French literature.

Laharpur, tn., Sitapur dist., Oudh, India, 58 m. N. of Lucknow. Pop. about 12,000.

Lahn, riv., prov. Hesse-Nassau, Germany, rises in the Rothaar in S. of Westphalia, flows S. and S.W. past Giessen, Wetzlar, and Ems, and enters the Rhine 6 m. above Koblenz. Length, 135 m.

La Hogue. See **HOGUE**.

Lahore, (1.) Division of Punjab, British India, comprising the districts of Lahora, Amritsar, Montgomery, Multan, Jhang, Gurdaspur, and Lyallpur. Area, 24,872 sq. m. Pop. (1901) 5,466,644. It is irrigated by the Bari Doab Canal and the branches of the Sutlej. Wheat, barley, maize, rice, cotton, sugar, tobacco, oil seeds, and opium are grown. (2.) Capital of district of same name, on l. bk. of the Ravi, 31° 36' N. and 74° 18' E. It is the railway centre of the province. Its carpets and silk and woollen goods are noted. Lahore's era of splendour was coincident with the reign of Akbar (1556-1605). The Sikhs took it in 1758, and later Ranjit Singh became master of the Punjab. A period of anarchy followed his death in 1839. In 1846 the British Council of Regency was established, and in 1849 the young maharajah transferred the government of the Punjab to the East India Company. Lahore thenceforth became the capital of a British province. In April 1905 Lahore suffered severely from earthquake shocks. Pop. (1901) 202,964.

Lahot, vil. in Sumatra, S. 12° S. and 104° 36' E., at the E. base of Mt. Dempo; important trade centre.

Lahr, tn., Baden, Germany, 29 m. N. of Freiburg; manufactures tobacco, cardboard, cottons, chicory, hats, leather wares, and horse-hair goods. Pop. (1900) 13,577.

Lai bach, chief tn. of the Austrian prov. Carniola, and (since 1461) episc. see, on a tributary of the Save, 83 m. S.W. of Graz. Iron, cotton, tobacco, and pottery are among the manufactures. The town was severely injured by an earthquake in 1895. Pop. (1900) 36,547.

Laidlaw, **WILLIAM** (1780-1845), friend and amanuensis of Sir Walter Scott, born at Blackhouse, Selkirkshire, and became acquainted with Hogg (whom his father employed as a herd) and Scott, the latter of whom he supplied with materials for the *Minstrelsy of the Scottish Border*. In 1817 he settled at Abbotsford as factor. Laidlaw was himself a poet, as his tender *Lucy's Flittin'* attests. See Lockhart's *Life of Scott*.

Laing, DAVID (1793-1878), Scottish historian and antiquary, born at Edinburgh; became secretary to the Bannatyne Club (1823), and edited seventeen of its publications, as also five works for the Abbotsford Club and three for the Hunterian Club. Became keeper of the Signet Library, Edinburgh (1837). Among other works edited by Laing are *Select Remains of the Ancient Popular Poetry of Scotland* (1822), *Early Metrical Tales* (1826), *Poems of William Dunbar* (1834; supplemented 1866), *Robert Baillie's Letters and Journals* (1841-2), and the *Works of John Knox* (1846-64). He bequeathed his collection of MSS. to Edinburgh University. See Stevenson's *Notices of David Laing* (1878).

Laing, MALCOLM (1762-1818), Scottish historian, born in Orkney. He wrote the final volume of Henry's *History of Great Britain* (1793), and in 1800 published a *History of Scotland from 1603 to the Union*. To this, in 1804, he added a dissertation on Queen Mary's complicity in the Darnley murder. He also published an edition of Ossian's poems.

Laing, SAMUEL (1812-97), British author and railway administrator, born at Edinburgh. He became secretary to the railway department of the Board of Trade, and was for several years chairman of the London and Brighton Ry. Co. He is best known, however, as a writer of popular works on scientific subjects, including *Modern Science and Modern Thought* (1885), *A Modern Zoroastrian* (1887), *Problems of the Future* (1889), *Antiquity of Man* (1891), and *Human Origins* (1892), all showing wide reading, and presenting their subjects in attractive form.

Laing's Nek, defile, Drakenberg Mts., Natal, 16 m. from its N. frontier. The railway to Charleston here passes through a tunnel 2,213 ft. long. Laing's Nek was the scene of a Boer victory over the British under Colley in 1881.

Lairesse, GÉRARD DE (1640-1711), Dutch painter, born at Liège; became a pupil of Bartholomew Flemael and of Poussin, and settled in Amsterdam. His paintings are of the severely classical school, the subjects being chosen mainly from ancient history and mythology. His best work, the *Death of Germanicus*, is in the Kassel Gallery. Other examples are in the Louvre, and at Berlin.

Lais, the name of two famous courtesans in ancient Greece. (1.) Probably a native of Corinth, lived about the time of the Peloponnesian war; one of her lovers was the philosopher Aristippus. (2.) A native of Hycara in Sicily, was brought to

Corinth at an early age. She lived during the 4th century B.C., being a contemporary and rival of Phryne. One of her favourites was Diogenes.

Laissez Faire, an economic epigram which has become the designation of the policy of unrestricted competition and no state interference. The epigram was adopted by Adam Smith, and Ricardo and the classical economists elevated it almost to the rank of a principle. The maxim is not absolute, and weightier considerations may be, and have been, invoked to set it aside—e.g. in sanitary and factory legislation.

Laius, in ancient Greek legend, was king of Thebes, son of Labdacus, and father of Oedipus.

Lake. A lake is a basin of water which is not in mutual communication with the sea. To volcanic action are due crater lakes, such as the lakes of Albano and Nemi, the Eifel and Auvergne; and the lava-dammed lakes, such as the Lac d'Aydat, in Auvergne. Landslips have dammed valleys and formed lake basins, as the Gohna lake, formed in the Himalaya in 1894. Sinks or shallow holes in porous limestone may be choked and form lakelets, and the polyes of the Karst are temporary lakes, due to the rise of ground waters in these dissolved and sunken areas. Rivers form lakes by the gradual dissolution of soluble limestone through lateral erosion, as in Loughs Ree and Derg; and underground lakes are due to similar decomposition of the rock.

The disputes about the origin of lake basins are keenest over those of glaciated areas. The great terminal moraines round Lake Maggiore or Lake Como suggest a glacial origin for these lakes; but the great depth of their basins requires proof of glacial erosion completing the work of river erosion. The Scottish Lake Survey results seem to point to a glacial origin for the Scottish valley lakes.

In course of time, through growth of deltaic deposits which fill up the end of a lake or cut it in two (as in the cases of Derwentwater, Bassenthwaite, and Brienz-Thun), and by erosion at the outlet, the lake basin gradually becomes filled up, when it is transformed into a mere, which eventually becomes a morass, and finally a solid plain.

The Lake Waters.—Lakes may be divided into fresh-water, brackish, and salt lakes. The salinity of the water is greatest in lakes with no outlet in rainless regions. The Dead Sea and Great Salt Lake are among the saltiest lakes, and are under such conditions.

Every transition from them to the pure fresh-water lakes can be found.

The waves on large lakes may equal those at sea. For quiverings of the lake waters, see SEICHES. For the fresh-water forms and flora of lakes, see GEOGRAPHICAL DISTRIBUTION.

Lake Charles, city, Calcasieu par., Louisiana, U.S.A., on Calcasieu R.; has an extensive trade in lumber, and numerous rice mills. Pop. (1900) 6,680.

Lake City. (1.) Town, Florida, U.S.A., the capital of Columbia co., 60 m. W. of Jacksonville, and is on the Georgia, Southern, and Florida, the Plant System, and the Seaboard Air Line railways. The town stands in a cotton-growing district. Manufactures of lumber. Pop. (1900) 4,013. (2.) Town, Wabasha co., Minnesota, U.S.A., 57 m. E.S.E. of St. Paul; is a favourite summer resort. Flour mills and wagon works. Pop. (1900) 2,744.

Lake Dwellings. See PILE DWELLINGS.

Lake District of England comprises adjacent parts of Cumberland, Westmorland, and Lancashire. Windermere, about 10½ m. long by less than 1 m. in breadth, is situated in the S.E., and connected with Rydal Water, Grasmere, Elther Water, and Esthwaite. More to the W. is Conistown Water, dominated by the peak called Conistown Old Man. In the N.E. is Ullswater, with Hawes Water to the S.E.; and to the W., beyond Helvellyn, Thirlmere, now the head reservoir of the Manchester water supply. North-west of Thirlmere are Derwentwater and Bassenthwaite, and N.E. the mountain group in which rise Skiddaw and Scafell. Buttermere, Crummock Water, and Loweswater lie S.W.; Ennerdale still further S.W., and West Water S.E. of the latter. Sty Head Pass, N.E. of West Water, is famed as the wettest place in England. There are several waterfalls. See Rawnsley's *Life and Nature at the English Lakes* (1899), and *Literary Associations of the English Lakes* (1894; new ed. 1901), also other works by the same author; H. R. Mill's *Bathymetrical Survey of the English Lakes* (1895); *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society*; Wordsworth's *Description of the Scenery of the English Lakes* (1823); Professor W. Knight's *English Lake District* (1878), and *Through the Wordsworth Country* (1887); Bradley's *Highways and Byways in the Lake District* (1901); Palmer's *Lake Country Rambles* (1902); Collingwood's *The Lake Country* (1902); and Cooper and Palmer's *English Lakes* (1905).

Lake School of Poets, THE, a title first applied in derision by the *Edinburgh Review* to the group of poets who ranged themselves round the poet Wordsworth in the Lake district of England. Amid the romantic beauty of the mountain glens of England there grew up a poetry of nature, and of man in harmony with nature, excelling in lofty and profound

Coleridge at Stowey, and saw the commencement of their joint production, the *Lyrical Ballads* (1798). During a long walk they planned the work. Wordsworth was to illustrate 'subjects chosen from ordinary life,' while the verses of Coleridge were to be of a 'supernatural' cast. In this they succeeded beyond expectation—the one with his *Lines on*

the beauty of landscape; but while 'the common growth of mother Earth' appealed only to Wordsworth, Coleridge found his theme in strange dreams and unknown climes. Their divergences would, however, have been greater had they never met. The influence of Wordsworth aroused Coleridge to the joyousness and beauty of nature, while Wordsworth owed to Coleridge something of human tenderness and of speculative and critical thought. Both were masters of poetic realism, and both inhabited the realm where romance and nature meet.

While the modern school of romantic criticism has at least not damaged the fame of Wordsworth, it has thrown a new lustre over that of Coleridge. To the Lake school Southey belongs only by residence and friendship; the true disciples were Shelley, Keats, and Byron, and from these has emanated the modern romantic school.

Other poets who have derived inspiration from the romantic beauty of the Lake district, but are not directly associated with the school, are Mrs. Hemans, Dr. Arnold, Edward Fitzgerald, Tennyson, Gray, and Charles and Mary Lamb.

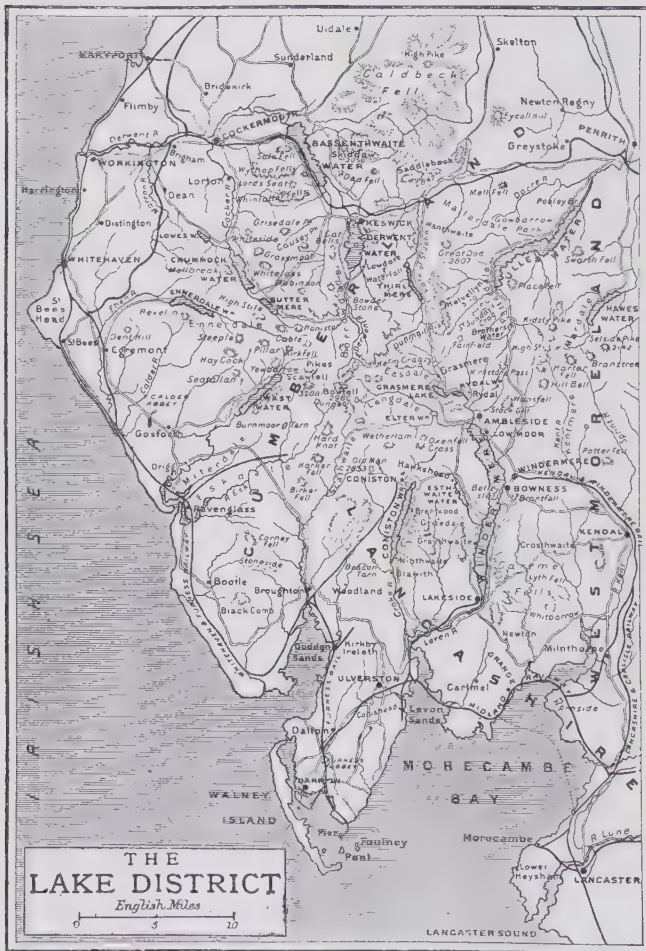
Lake Geneva, Huron, etc. See GENEVA, HURON, etc.

Lake of the Thousand Islands. See ST. LAWRENCE.

Lake of the Woods, large sheet of water on the frontier between Minnesota, U.S.A., and Ontario, Canada. It derives its name from the wooded islands with which it is studded and the surrounding tree-clad hills. It is fed by the Rainy R., and the Winnipeg takes the surplus to Hudson Bay. Length, 65 m.; circumference, 300 m.

Lakes are the compounds formed when a dye-stuff unites with a mordant, which is usually a metallic hydroxide, to form an insoluble pigment. Thus alizarin unites with aluminium hydroxide to form a red lake, and cochineal with aluminium or tin hydroxide to form a carmine, the presence of calcium salts and other ingredients appearing in both cases to have a considerable influence on the colour. Lakes are not only formed in the fibres of textiles to produce dyes, but are also precipitated alone for use as pigments, the following being the principal examples of this class of colours—madder lake, crimson lake, carmine, and Dutch pink.

Lakh, from Sanskrit *laksha*, 'one hundred thousand.' The word is employed in India to signify 100,000 rupees, of which the nominal value is £10,000 and the actual value about £8,000.



thought. Wordsworth, the acknowledged head and founder of the new school, had his home for fifty-one years in the Lake district—at Grasmere for the fourteen years from 1799 to 1813, and at Rydal Mount for the remaining thirty-seven. Here his constant companion was his gifted and sympathetic sister Dorothy.

The year 1797 was marked by the meeting of Wordsworth and

Tintern Abbey, We are Seven, Simon Lee, and Expostulation and Reply; and the other with his inimitable *Rime*. These two great poets were at once profoundly akin and strikingly different. They surpassed all other poets of their day in delicacy of perception and in imaginative power. For both, the universe was alive and full of mysticism. They were equally sensitive to

Lakhimpur, or LĪKHIMPUR, great tea-growing dist. in the Brahmaputra valley, div. of Assam, British India; has coal mines and petroleum wells, worked by the Assam Railways and Trading Company. The chief centres are Digboi and Makum. The civil headquarters are at Dibrugarh. Area, 3,724 sq. m. Pop. (1901) 371,784.

Laking, SIR FRANCIS HENRY (1847), physician in ordinary to H.M. King Edward VII. and the Prince of Wales. He was also surgeon-apothecary to Queen Victoria (whom he attended in her last illness). In 1898 he attended the King (then Prince of Wales) after his severe accident at Wadsworth Manor, and was one of His Majesty's physicians during his dangerous illness of 1902.

Lakshmeswar, tn., feudatory state of Miraj, Bombay, India, 40 m. S.E. of Dharwar. Pop. about 10,000.

Lakshmi, or Śrī, in Hindu mythology, the consort of Vishnu and the goddess of fortune and beauty; generally represented in gold, seated upon a lotus. She is mother of Kāma, the Hindu god of love.

Lalande, JOSEPH JÉRÔME LE FRANÇAIS DE (1732-1807), French astronomer, was born at Bourg. Dispatched in 1752 from Paris to Berlin, to make observations of the moon's parallax there, he was on his return appointed adjunct-astronomer to the Paris Academy. He was professor of astronomy at the Collège de France (1762-1807). His observations of 50,000 stars, given in *Histoire Céleste Française* (1801), proved invaluable, and he wrote several successful popular works. The Lalande Prize was instituted by him in 1802, to reward the chief astronomical performance of each year.

Lalin. (1.) Township in Pontevedra prov., N.W. Spain, in a mountainous agricultural district, 50 m. S.S.E. of Corunna; has paper mills and tanneries. Pop. (1900) 17,882. (2.) Walled town of Manchuria, 85 m. N.N.E. of Kirin, on a river of same name. Pop. about 20,000.

La Linea. See LINEA.

Lalita-Vistara, one of the nine principal religious works of the Buddhists, containing the life and doctrines of the Buddha, Śākyamuni. An English translation has been made from the Sanskrit text, and a French one (by P. E. Foucaux) from the Tibetan. See Burnouf's *Introduction à l'Histoire du Bouddhisme Indien* (1844), and *Transactions of the Bengal Asiatic Society*.

Lalitpur, tn., Lalitpur dist., North-West Provinces, India, 110 m. S.E. of Gwalior. Pop. 11,000.

Lally-Tollendal, THOMAS ARTHUR, COMTE DE (1702-66), French general and administrator, was born at Romans (Drôme); and after a career of distinction in the French army, as also in the Jacobite expedition to Scotland (1745), was sent as commander-in-chief to the E. Indies (1756). At first successful against the British, he was deserted by the fleet under Laché, and, without food or supplies, forced back from Madras, and compelled, after a close blockade of eleven months, to surrender Pondichery (1761). On his return to France he was sent to the Bastille, and two years later brought to trial and beheaded. This judicial crime was exposed by Voltaire, and by the victim's son in 1773, and in 1778 Louis XVI. reversed the sentence. See Voltaire's *Siècle de Louis XV.*

Lally-Tollendal, TROPHIME GÉRARD, MARQUIS DE (1751-1830), French politician and author, son of the above, born in Paris. He represented the Parisian noblesse in the États Généraux (1779); defended Louis XVI. (1789); retired to Switzerland (1791), but became minister of state, peer of France, and member of the Academy under Louis XVIII. (1815). His publications include *Plaidoyer pour Louis XVI.* (1795); *Défense des Emigrés Français, adressée au Peuple Français* (1794); and *Le Comte de Strafford, Tragédie* (1795).

Lalo, EDOUARD VICTOR ANTOINE (1823-92), French composer, born at Lille. His compositions, though not numerous, display marked individuality, the orchestration being especially skilful. His works include symphonies, orchestral suites, ballets, concertos, sonatas for violin and for 'cello, quartets, trios, and songs.

La Louvière, coal-mining centre of Belgium, prov. Hainaut, 13 m. N. by E. of Mons. Pop. (1900) 17,570.

Lama. See LLAMA.

Lamachus, Athenian general in the Peloponnesian war. With Nicias and Alcibiades he commanded the expedition against Sicily in 415 B.C., and was killed at the investment of Syracuse (414 B.C.). He is represented as a brave and earnest soldier. See Thucydides, Aristophanes, and Plutarch.

Lamaism. The religion of the Tartar races of Tibet, Mongolia, Manchuria, and Northern Nepal. Lhasa, the 'Rome' of Lamaism, is the capital of Tibet, and till recently was a forbidden city to the European. It seems probable that the nature worship of the nomad Mongol was touched by the precepts of Lao-Tsu and Confucius and tinged by the preachings of Nestorian monks

before it absorbed a Buddhism which had already lost its savour. Whatever the influences which helped to mould this faith, the acceptance of Buddha as an incarnation of the divine essence resulted in the establishment at Tibet of a hierarchy in the person of a Dalai Lama ('sea of wisdom'), whose judgment is supreme and unquestionable. The prayer of Lamaism is of Sanskrit origin, 'Om mani padmi hum' (Oh! the gem in the lotus. Amen). To facilitate repetition, the prayer is engraved on rocks and inscribed on flags; while praying wheels, worked by hand, by wind, and by water, proclaim the message of Lama salvation.

Encouragement of celibacy led to the foundation of lamaseries throughout the countries which acknowledge the creed. These monasteries, many largely endowed and some capable of housing 30,000 individuals, are the churches, colleges, schools, and hospitals of the people, the resort of pilgrims, and the repositories of Lamaesque arts, science, and literature. The pontiff is established at Lhasa, but each lamasery has its 'living Buddha' or Grand Lama. A Grand Lama does not die, but, from time to time, he lays aside his human envelope and is rejuvenated. New 'living Buddhas' are always sought for and discovered in Tibet; and the choice usually falls on a boy between four and five years of age, amenable to the instruction and training required for his high position. See BUDDHISM, TIBET; also Köppen's *Die Lamaische Hierarchie und Kirche* (1859), and the works of Rhys-Davids on Buddhism.

Lama Miao. See DOLON-NOR.

La Mancha. See MANCHA.

Lamantin, a name sometimes applied to the manatee and the dugong, in order to mark the distinctions between them and the extinct sea-cow (*Rhytina stelleri*). See SIRENIA.

Lamarck, JEAN BAPTISTE PIERRE ANTOINE DE MONNET, CHEVALIER DE (1744-1829), a French naturalist and evolutionist, and the ablest precursor of Darwin, was born at Barentin. While working in a banker's office in Paris he wrote his *Flore Française* (1778). As tutor to Buffon's son he travelled over Europe, visiting many of its famous gardens. In 1788 he became custodian of the herbarium of the Jardin du Roi, and later was associated with this garden as a professor of zoology, a post he held for twenty-five years. In 1809 he published his famous *Philosophie Zoologique*, and between 1815 and 1822 he published the seven volumes of his *Histoire des Animaux sans Vertèbres*.

Lamarck was also a voluminous writer on other scientific subjects.

Apart from his concrete observations, which were numerous, Lamarck placed biological science under a deep debt of gratitude by his clear statement of a doctrine of evolution which, though it failed to satisfy Charles Darwin, yet paved the way for the English scientist's great work. He laid great stress upon the effects of use and disuse, upon the production of new organs as the result of new needs, and especially upon what is now known as the inheritance of acquired characters, believing that those changes produced in the individual as the result of its response to the environment are always transmitted to the offspring, and thus lead to progressive change. This is a position which perhaps the majority of living naturalists consider untenable since Weismann's criticisms; but there is, nevertheless, a considerable Neo-Lamarckian school in America, and also in France. See Haeckel's *Die Naturanschauung von Darwin, Goethe, und Lamarck* (1882); *Lamarck, par un Groupe de Transformistes, ses Disciples* (1887); Perrier's *Lamarck et le Transformisme Actuel* (1893).

Lamarckia, a genus of grasses containing only the one species, *L. aurea*. This is a native of the south of Europe and opposite coast-region of Africa. It is a low-growing annual, with pretty, crowded panicles of two-flowered spikelets.

La Marmora, ALFONSO FERRERO, CAVALIERE DEL (1804-78), Italian general and statesman, born at Turin. He distinguished himself during the Sardinian war of independence (1848), and as minister of war (1849-55) reorganized the army. During the Crimean war he commanded the Sardinian forces, and on his return again became minister of war. He commanded the troops in the Austrian war, was defeated at Custoza, and severely censured. In self-defence he wrote *Un po più di luce* (1873), which irritated Bismarck, and exposed La Marmora to a charge of having betrayed state secrets.

Lamartine, ALPHONSE MARIE LOUIS DE PRAT DE (1790-1869), French poet, was born at Mâcon. He received his education at the Jesuit College of Belley, travelled in Italy, and after the second restoration was allowed to select his own career, though he had some employment in the king's household, and subsequently in diplomacy. In his thirtieth year Lamartine published his first volume of poetry, *Premières Méditations Poétiques* (1820), which achieved an immediate success. In 1823 and 1825 Lamartine

published three more volumes, *Nouvelles Méditations Poétiques* (1823), *La Mort de Socrate*, and *Le Dernier Chant de Childe-Harold* (1825), the last of which proclaims clearly enough whence Lamartine drew his first inspiration in poetry.

In 1829 he was elected a member of the Academy. In 1830 he published his *Harmonies Poétiques et Religieuses*, in 1835 (in prose) *Voyage en Orient* (his experiences of a yachting tour), in 1836 *Jocelyn* (the history of a country parson), in 1838 *La Chute d'un Ange*, and in 1839 *Recueillements Poétiques*—all poems. It was about this time that Lamartine threw himself into politics upon the Moderate Liberal side. From 1835 to 1837 he was *député* for Bergues in the Nord, and from 1837 to 1848 *député* for Mâcon. In politics he played as conspicuous but a less lasting part than in the field of literature. At the revolution of 1848, Lamartine rose to a very conspicuous place, especially as the defender of the 'tricolor' against the 'rouges.'

Under the empire Lamartine gradually sank into comparative poverty, having squandered a considerable patrimony, the fortune of his wife, and large literary gains; and he was obliged to write rapidly and superficially a great number of works in prose. Some poetry was intermingled (*Les Visions*, 1854), not of the highest quality. With a diminished lustre, Lamartine remained still one of the personages of French literature till his death. Lamartine was granted a pension by Parliament (1867), but his powers by that time were exhausted, and he died two years later. In addition to the works mentioned, Lamartine wrote—in verse, *Toussaint Louverture*, a tragedy (1850); and in prose, *Trois mois au Pouvoir* (1848), *Raphaël* (1849), *Confidences* (1849), *Histoire de la Révolution*, 1848 (1849), *Geneviève* (1850), *Nouvelles Confidences* (1851), *Le Travailleur de Pierres de Saint-Point* (1851), *Graziella* (1852), *Histoire de la Restauration* (1851-2), *Histoire des Constituants* (1854), *Histoire de la Turquie* (1855), and *Histoire de la Russie* (1856). His *Œuvres Complètes* were published by Didot in 14 vols. (1849-50). See Falconnet's *Alphonse d' Lamartine* (1840); Lurine's *Histoire Poétique et Politique de Alphonse de Lamartine* (1848); Sainte-Beuve's *Portraits Contemporains*, I., and *Causeries du Lundi*, I., IV.; Ronchard's *La Politique de Lamartine* (1878); Alexandre's *Souvenirs sur Lamartine* (1884); Lady Dornville's *Life of Lamartine* (1888); and Deschanel's *Lamartine* (1893).

Lamb, CHARLES (1775-1834), essayist, was born in the Temple, London. After some education at a little school off Fetter Lane, he was sent to Christ's Hospital in 1782, among the other new boys at the same time being Samuel Taylor Coleridge, with whom a friendship then began which ceased only with Coleridge's death in 1834. Lamb remained at Christ's Hospital until 1789, soon afterwards obtaining a nomination to a small clerkship in the South Sea House, where his elder brother John held office—a post which led thirty years later to the first of the *Essays of Elia*, entitled, 'Recollections of the South Sea House.' Leaving the South Sea House after only a brief sojourn there, Charles Lamb, on April 5, 1792, entered the East India House, nominated thereto by his father's employer, Samuel Salt, M.P., one of the benchers of the Inner Temple, and remained in its service until 1825.

The same year (1792) saw the death of Mr. Salt, causing the Lamb family to leave his quarters in the Temple for lodgings elsewhere. These were found at 7 Little Queen Street (where Trinity Church now stands); and there, on Sept. 22, 1796, an incident occurred which changed the whole character of Charles Lamb's life. His sister Mary, who had long been strange in manner, suddenly lost her reason and stabbed her mother fatally. At the inquest Mary Lamb was found to be insane, and ordered to be confined in a public asylum; but Charles, on undertaking to be responsible for her, was allowed to arrange for private restraint. From that day until his death the welfare of his sister was his first consideration.

Charles Lamb's earliest literary efforts were in verse. In 1796 he contributed four sonnets to Coleridge's *Poems on Various Subjects*. In 1797 he contributed a whole section to the second edition of that work; and in 1798 he joined with Charles Lloyd, a young Quaker metaphysician, lately Coleridge's pupil, in the composition of a volume called *Blank Verse*, in which 'The Old Familiar Faces' and the most personal and feeling of all his poetical work is to be found. In the same year (1798) was published his first prose work, *Rosamund Gray*, a story beginning with the simplicity of Wordsworth in the *Lyrical Ballads*, very charmingly done, but continuing more in the manner of Mackenzie, whose novel in letters, *Julie de Roubigné*, Lamb had been reading. Another experiment, this time in irregular blank verse, followed in *John Woodvil*, an attempt to recapture the Elizabethan spirit

seriously just as in 1795-6 Lamb had joined with James White, an old schoolfellow, in recapturing its comic spirit in *Falstaff's Letters*. John Woodvil was published in 1802, at Lamb's own expense, but it met with little favour.

Between 1800 and 1805 Lamb contributed paragraphs and epigrams to newspapers, but wrote nothing remarkable. Between 1805 and 1810, however, came a period of great productivity. Besides his India House work, he found time to write an unsuccessful farce, *Mr. H.*, produced at Drury Lane, Dec. 10, 1806, for one night only; to begin his children's books for Mrs. William Godwin with *The King and Queen of Hearts* (1805), followed by *Tales from Shakespear* (with Mary Lamb, 1807), *The Adventures of Ulysses* (1808), *Mrs. Leicester's School* (with Mary Lamb, 1809), *Poetry for Children* (with Mary Lamb, 1809), and *Prince Dorus* (1811, or earlier); to select his *Specimens of English Dramatic Poets who lived about the Time of Shakespear* (1808); and to write a number of humorous letters and critical essays for Leigh Hunt's magazine, the *Reflector* (1810-11). Of these the best were the essays *On the Genius of Hogarth* and *On Shakespear's Tragedies*, which, taken in connection with the *Dramatic Specimens*, showed the discerning that a new, courageous, and very discriminating critical mind was in their midst.

Then followed, however, a curiously empty ten years, in which Lamb, to the best of our knowledge, wrote nothing but two or three essays, including the *Confessions of a Drunkard*, a few brief notes and theatrical criticisms in the *Examiner*, and a few epigrams in the *Champion*. In 1818 he collected his *Works*, which contained, however, very little that was new.

But in 1820 came a change. In that year was founded the *London Magazine*. John Scott, the editor, acting, it is said, upon the suggestion of Hazlitt, asked Lamb to contribute. Lamb accepted the invitation, the essay on the South Sea House, signed 'Elia' (the name of an old South Sea House clerk in Lamb's day), appeared in the August number, and Lamb's ripest and best-known work had begun—in his forty-sixth year. Almost everything by which he is best known was written between 1820 and 1823. For five years Lamb continued with the *London Magazine*. He then moved to the *New Monthly Magazine* for a while, and contributed to it the *Popular Fallacies*. He also gave William Hone, for his *Table Book* (1827), the fruit of his researches for

notable passages in the Garrick collection of old plays in the British Museum; and in 1830 he collected his later poems to form a book, *Allum Verses*, with which his young friend Edward Moxon (who married his ward, or adopted daughter, Emma Isola) might make a start as a publisher. A year later he issued a burlesque poem, *Satan in Search of a Wife*, and in 1833 a second collection of *Elia* essays.

Lamb remains in our minds first and foremost as an essayist. His *Elia* (1823) and the *Last Essays of Elia* (1833) are two volumes which stand quite alone in English literature. Lamb was pensioned off by the East India directors in 1825. He was then living at Islington, in a cottage in Colebrooke Row that still stands, and, in-



Charles Lamb.

ternally, is practically as he left it. Later he moved to Enfield, and thence to Edmonton, where he died.

Crabb Robinson's *Diary* gives us many glimpses of this rare figure, but it is upon Talfourd's *Memorials of Charles Lamb* (1837) and *Final Memorials of Charles Lamb* (1848) that all later biographies have been based. Other valuable character sketches are found in Hazlitt's essays, Wordsworth's poem on Lamb's death, Fitzgerald's *Charles Lamb* (1866), De Quincey's *London Recollections*, Barry Cornwall's *Memoir* (1836), and E. V. Lucas's *Life of Charles Lamb* (1905).

The best editions of Lamb's writings are *Life and Works*, ed. by Canon Ainger—*édition de luxe*—(12 vols. 1899-1900); *Works of Charles and Mary Lamb*, ed. by E. V. Lucas (7 vols. 1903).

Lamb, MARY ANNE (1764-1847), writer for children, and sister of Charles Lamb, was born in the Temple. Like her brother, she came to her own slowly. Mary Lamb was forty-two before, in 1806, she began the *Tales from Shakespear*, her first book. After 1800 she lived with her brother, and shared his intellectual life until his death in 1834—a companionship broken only by almost annually recurring attacks of insanity of some weeks' duration.

Of the twenty *Tales from Shakespear* Mary wrote fourteen, the comedies and *Pericles*; her brother, the six tragedies. The sweet reasonableness and narrative charm of these tales has carried them into numberless editions, not only in English, but in many other languages, and they seem likely to endure as long as any children's book. *Mrs. Leicester's School*, to which Charles contributed only three stories ('Maria Howe,' 'Arabella Hardy,' and 'Susan Yates'), followed in 1809, a little work of rare and delicate charm, which contains Mary Lamb's prose masterpiece, 'The Young Mahometan.' This book also is still steadily reprinted, and will continue to be. The same year saw the publication of *Poetry for Children*, two tiny volumes of simple verses drawn from every day incidents by Mary Lamb and her brother. With these three books Mary Lamb's career as an author began and ended; but in 1815 she contributed an essay on 'Needlework' to the *British Lady's Magazine*, and in her brother's *Works* (1818) are several beautiful and striking little poems from her pen.

The principal authorities for information concerning Mary Lamb are Mrs. Gilchrist's *Mary Lamb* (Eminent Women Series, 1883), and W. C. Hazlitt's *Mary and Charles Lamb* (1874), and *The Lambs: their Lives, their Friends* (1897).

Lamballe, MARIE THÉRÈSE LOUISE, PRINCESSE DE (1749-92), born at Turin; was a famous beauty, the friend of Marie Antoinette, and head of that queen's household. She voluntarily returned from England to share her mistress's imprisonment, and, refusing to renounce her allegiance to the queen, was killed by the Paris mob. See Bertin's *Made-moiselle de la Lamballe* (1888).

Lambayeque, maritime dep. of N.W. Peru, S. America, divided into three provinces—Lambayeque, Chiclayo, and Pecosmayu; produces sugar, rice, tobacco, and cotton. Area, 17,339 sq. m. Pop. 124,000. Its cap., Lambayeque, 6 m. from mouth of Lambayeque R., exports cotton and woollen goods and soap. Pop. 6,000.

Lambert, JOHANN HEINRICH (1728-77), German philosopher and mathematician, born at Mülhausen; devoted himself to varied scientific studies, and published his *Photometria*, an important work dealing with the measurement of light (1760). Besides numerous mathematical and philosophical treatises, he wrote *Neues Organon* (1764), and *Anlage zur Architectonik* (1771). See Lepsius's *Johann Heinrich Lambert* (1881).

Lambert, JOHN (1619-83), British soldier, was born at Calton, near Malham Tarn, Yorkshire. On the outbreak of the civil war he threw in his lot with Cromwell, led the parliamentary right wing at Marston Moor, became major-general of the north (1647), fought at Preston and Dunbar, and shared in the victory of Worcester. Having crushed Booth's royalist rising (1659), he was for a time paramount as chief of the 'Committee of Safety.' But the 'Rump' and Monk's deeper policy proved too much for him; and after the restoration he was arrested, and was banished to Guernsey. See Life in Whitaker's *Hist. of Craven*, ed. by Morant (1878).

Lambessa, or **LAMBÈSE**, t.n. of Algeria, N. Africa, 65 m. S.W. of Constantine, 5 m. S.E. of Batna, is supposed to occupy the site of Lambesis, the ancient military capital of Numidia. Pop. about 2,000.

Lambeth, metropolitan bor., London, on the Thames, opposite Westminster. Lambeth Palace, the residence of the archbishops of Canterbury, was founded in the 12th century; but the present buildings belong to the 13th century and later periods. The great hall containing the valuable library, chapel, and crypt, are of special interest. Area, 4,194 ac. Pop. (1901) 301,895. See Tanswell's *Hist. and Antiquities of Lambeth* (1858); Cave-Browne's *Lambeth Palace and its Associations* (1882); Pim's *The Builders of Lambeth Palace* (1898).

Lambeth Conferences. The wide and rapid growth of the Anglican communion throughout the British colonies and America (see Canon Tucker's *English Church in Other Lands*, 1886) during the 19th century made some kind of a general synod an imperative necessity. Bishop Hopkins of Vermont, U.S.A., suggested a Pan-Anglican synod to the Archbishop of Canterbury so early as 1851. In 1865 a request of the same kind reached Archbishop Longley from Canada. After consultation with the houses of convocation he consented, and convened a meeting of all bishops of the Anglican communion to be held at Lam-

beth in 1867. The result was very successful, and the conferences have proved to be peculiarly suited to the genius of the Anglican Church. The first conference, held in 1867, was attended by 76 bishops, while the fourth (1897) was attended by 194. At the first the Colenso case formed the principal subject for discussion, while the third (1888) was of special interest as considering the position of Christian communities which do not possess the historic episcopate. The famous 'Lambeth Quadrilateral' was then formulated as a basis for home reunion—i.e. the Holy Scriptures, the Apostles' and Nicene creeds, the two sacraments ordained by Christ himself, and the historic episcopate. See Davidson's *The Lambeth Conferences of 1867, 1878, 1888* (1896); *Conference of Bishops of the Anglican Communion, Encyc. Letter* (1897).

Lambton, HEDWORTH (1856), rear-admiral, naval A.D.C. to the King, is the third son of the second Earl of Durham. He entered the navy in 1870, was present at the bombardment of Alexandria (1882), and took part in the battle of Tell-el-Kebir (1882). From 1894 to 1897 he acted as private secretary first to Earl Spencer and afterwards to Lord Goschen as First Lords of the Admiralty. During the recent Boer war he commanded the Naval Brigade in the defence of Ladysmith. In 1901 he was appointed commander of the royal yacht *Victoria and Albert*, second in command of the Channel fleet early in 1903, and, in October 1904, rear-admiral for the cruiser division of the Mediterranean fleet.

Lamego, t.n., Beira prov., Vizeu dist., Portugal, 42 m. E. of Oporto; has a cathedral, and is the seat of an Episcopal bishop. Has large vineyards. Pop. (1900) 9,179.

Lamellibranchiata, a name given to bivalve molluscs on account of the structure of the gills, which form flat, membranous plates or lamellae. See BIVALVES, and MOLLUSCA.

Lamellicornia, or **LAMELLI-CORN BEETLES**, a tribe of beetles in which the antennae have their terminal joints leaflike, and capable of separation and apposition—a character by means of which the insects are very readily recognized. The tarsus in Lamellicorn beetles has always five joints. The series includes three families—(1) the Passalidae, which are N. American beetles, quite absent from Europe; (2) the Lucanidae, or stag-beetles, which are very widely distributed; and (3) the Scarabæidae, or chafers, a very large family, including some 13,000 species, many of

which are very handsome. In all cases the larvæ live on decaying vegetable matter, roots, or dung, and are large, clumsy grubs, with curved bodies adapted for an underground or concealed mode of life. An example of a Lamellicorn beetle is the cock-chaffer. For details, see ROSE-CHAFER, STAG-BEETLE, etc.

Lameness may result from disease or injury of bones, joints, ligaments, muscles, or nerves, but usually more than one tissue element is concerned in its production. Thus, in infantile paralysis the primary seat of disease is the nervous system; but, as a result of changes there, the paralyzed muscles become atrophied and the ligaments contracted, the bones undergoing such distortion as to destroy the mobility of one or more joints which are normally movable. Paralytic conditions produce lameness, in the first place, by disabling a muscle or a group of muscles. Should one group be paralyzed, the opposing muscles, from lack of the normal resistance, may pass into continuous strong contraction, and finally produce fixation of the bones in an abnormal position.

Of bones and joints, the chief injuries which produce lameness are fractures and dislocations. As a consequence of such a disease as tubercle, a joint may become disorganized and useless. Some rheumatic and rheumatoid affections, especially in old people, are progressive, and cripple the patient permanently. Apart from paralysis, many nervous diseases, such as locomotor ataxia, produce a characteristic abnormal gait; while hysteria and other neuroses must be kept in mind as possible causes of lameness. In the treatment of lameness, the cause of the condition must first be ascertained, and, as far as possible, removed. Much may often be done to mitigate lameness by skilfully-contrived apparatus to counteract the existing defects.

Lamennais, FÉLICITÉ ROBERT DE (1782-1854), French abbé and philosopher, belonged to a very old family of the *bourgeoisie* at St. Malo. He was brought up by an affectionate elder brother who was a priest. They lived together at La Chesnaie, near Dinan, till, in 1814, the younger brother went to Paris. In 1815 he spent the 'Hundred Days' in England, where the Abbé Carron found work for him in London, and had immense influence over him during this period of his life. This influence he used to make Lamennais take orders. After the revolution of 1830 he assisted in founding *L'Avenir*, with its motto, *Dieu et Liberté*; and when it was condemned by ecclesiastical au-

thority, he went to Rome with its co-founders, Montalembert and Lacordaire, to plead the cause of liberty. The Pope declared against him; and while his two colleagues submitted, he resisted, and soon broke all connection with the church. His most remarkable production, the small but tremendous *Paroles d'un Croyant*, appeared in 1834, a masterpiece of religious fervour. For the rest of his life he belonged to the democratic party, and fiercely attacked the opinions of which he had been hitherto the foremost champion. Renan, who wrote in his *Essais de Morale et de Critique* (1859) a masterly paper about Lamennais, declares that his life might be summarized in the words, 'The same system of eloquent hatred applied to the most diverse objects.' Book after book he wrote, for one of which he underwent a year's imprisonment in Sainte Pélagie. Paper after paper he started during the 1848 revolution, when he was elected a representative in the Assembly, and took his place on the extreme left. His *Œuvres Complètes* were published in 1836 and 1844, and were followed by his *Œuvres Posthumes* (1855-8), his *Correspondance* (1866), and his *Confidences and Correspondance Inédite* (1886). See Sainte-Beuve's *Portraits Contemporains* (1846); Quérard's *Notice Bibliographique des Ouvrages de Lamennais* (1849); Blaize's *Essai Biographique sur Lamennais* (1858); Janet's *La Philosophie de Lamennais* (1890); and Mercier's *Lamennais* (1894).

Lamentations, THE BOOK OF, a short poetical book of the Old Testament, called in Heb. *'Ekkah* (i.e. 'How'), from its first word, and consisting of elegies expressive of the sufferings of the people of Jerusalem during and after the siege (587 B.C.). In the English Bible, as in the Septuagint, it follows Jeremiah, in accordance with the tradition that it was written by that prophet; in the Hebrew canon it forms one of the five Megilloth, or 'Rolls.' The tradition which attributes the booklet to Jeremiah is of long standing; and, indeed, the Septuagint version opens with a verse (not in the Hebrew) expressly affirming his authorship. It certainly reveals not a few affinities of thought and language, and if the divergences are still more evident, these might be explained by the diversity of theme and of form. Yet the artificiality of construction consorts but ill with what we know of Jeremiah's disposition and circumstances; and as striking linguistic parallels can be traced with Ezekiel, Deutero-Isaiah, and Job, and the unity of the book is

doubtful, the critics have reversed the judgment of tradition, placing its date about half a century after the destruction of Jerusalem. See Driver's *Introduction* (6th ed.), and commentaries by Ewald, Oettli, Reuss, Löhr, Budde, Cheyne (*Pulpit Com.*), Streane (*Cambridge Bible*), and Adeney (*Expos. Bible*).

La Mesa, tn., dep. Cundinamarca, Colombia; centre of trade in cacao, salt, and grain between the towns of Cundinamarca and Tolima. Alt. 4,200 ft. Pop. 14,000.

La Mettrie, JULIEN OFFROY DE (1709-51), French philosopher, born at St. Malo. After studying for the church, he adopted medicine as a profession, and served for some time in the army; but on publishing two strong works on materialism, he had to leave France and take refuge in Berlin under the protection of Frederick the Great, who gave him every encouragement in his extreme views. When La Mettrie died, the emperor wrote his memoir, and prefixed it to an edition of his protégé's *Works* (1774). See Lange's *Geschichte des Materialismus* (new ed. 1887).

Lamia, L. ÆLIUS (d. 33 A.D.), a friend of Horace, who dedicated to him two of his odes. He was consul in 3 A.D., and prefect of the city in 32. See Horace's *Odes*, iii. 17; and Merivale's *Romans under the Empire*.

Lamia, a female phantom, or ogress, in ancient Greek legend, said to have been a Libyan queen, whom Zeus loved. Hera, from jealousy, deprived her of her children; and Lamia, in revenge, seized other people's children, and murdered them. In later writers Lamie are represented as ogresses which took a beautiful form, and enticed young men into their embraces in order to feed on their flesh and blood. See Diodorus; Plutarch, *De Curiosis*; Philostratus; Apuleius; and Keats's *Lamia*.

Lamia, cap. nomarchy Phocis-Phthiotis, Greece, 28 m. S.E. of Pharsalos, on the side of a hill, near the head of the Gulf of Lamia; contains a mediæval fortress, a mosque, and remains of the ancient city from which the Lamian war took its name. Camels are reared. Pop. (1896) 7,414.

Laminariæ, a group of Algæ belonging to the Phæosporeæ, a subdivision of the Phæosphyceæ, or brown seaweeds. The propagative cells are always swarm-spores of similar form and size; and these are produced in unilocular sporangia. The thallus has a stalk, often of considerable thickness, which is attached below to rocks or other substratum by means of rootlike growths,

and ends above in a flat lamina, which may be divided or undivided.

Lamination. Beds of clay and of shale are often composed of thin layers parallel to the bedding planes, and in shales these layers or laminae separate readily when exposed to the weather. Probably they represent successive



Laminaria saccharina.
1, Sporangia.

thin sheets of deposit laid down one after another on the bottom of still waters; they may, however, to some extent be due to the action of the pressure of superincumbent accumulations after deposit. Laminated rocks are fissile, and in this respect resemble cleaved slates. See CLEAVAGE.



Lamium album.
1, Flower (section).

Lamium, a genus of Labiatæ, whose flowers are marked by possessing four stamens longer than the corolla tube, a bell-shaped

calyx with five teeth, and a two-lipped corolla, the upper lip being arched, the lower trifid and spreading. The commonest British species are the white dead-nettle, or archangel, *L. album*, with square stem and white flowers with black stamens, and the purple-flowered dead-nettle, *L. purpureum*.

Lammas Day. Lammas day is August 1. It is a quarter-day in Scotland. Old Lammas day is August 12.

Lammas Floods is the name applied in Scotland to the very wet period usually experienced about Lammas day. The proverbial wetness of this period is thoroughly supported by statistical evidence, the wettest day of the year in Edinburgh, on the mean of eighty-eight years, being August 13.

Lammas Lands are lands in England in which rights of common exist from old Lammas day (August 12) till March 25 (Lady day) in every year. For the rest of the year they are in private ownership. The right of common may belong to any class—e.g. the parishioners, freemen, or the holders of certain tenements.



Lammergeier.

Lammergeier (*Gypaetus barbatus*), a large and handsome bird of prey, formerly distributed throughout the mountainous regions of S. Europe, and extending to the Himalayas and N. China. The lammergeier differs from the vultures in the fact that the head is fully feathered; but it is regarded by many naturalists as akin to them, and the name 'bearded vulture,' derived from a tuft of feathers on the lower jaw, is often applied to it. The length of the body is about forty-two inches, and the expanse of wing may exceed nine feet. The head and the sides of the face are white, with a black cheek-stripe; the upper parts are black, tending to brown, and the under tawny orange. The sclerotic or 'white' of the eye is crimson, which gives the bird a very striking appearance. It does not appear that the bird ever attacks man; it probably feeds entirely on carrion, although it is stated to carry off lambs, kids, and fowls

occasionally. The flight is powerful and majestic, and the cry weak and querulous.

Lammermoors, or LAMMER-MUIR HILLS, broad range of hills in the S. of Scotland, stretching E.N.E. in the shires of Berwick and Haddington, from the valley of the Gala to St. Abb's Head. Highest summits, 1,750 ft.

Lamont, JOHANN VON (1805-79), astronomer and magnetician, was born at Braemar, Aberdeenshire. Educated at a Scottish Benedictine monastery in Ratisbon, he entered the observatory of Bogenhausen near Munich in 1828, became its director in 1835, and established there in 1840 a magnetic observatory. His discovery of a decennial magnetic period was announced in September 1850; and the results of his magnetic surveys of Bavaria, France, Spain, North Germany, and Denmark were published in three separate works (1854-9). His chief astronomical labour was the preparation of eleven catalogues (1866-74), founded on zone-observations of 34,674 stars. He was appointed in 1852 professor of astronomy in the University of Munich.

Lamorière, LOUIS CHRISTOPHE LÉON JUCHAULT DE (1806-65), French general and politician, born at Nantes; fought through the Algerian wars (1833-47), taking a leading part in Abd-el-Kader's defeat. He directed the attack on the Paris barricades (1848), became war minister under Cavaignac (1848), and was exiled by Napoleon III. (1852). In 1860, during the Italian war of independence, Lamorière led the papal troops. Permitted to return to France, he died at Proussel, near Amiens. See Keller's *Le Général de Lamorière* (new ed. 1901), and Rastoul's *Le Général Lamorière* (1894).

La Motte, ANTOINE HOUDAR DE, generally known as La Motte-Houdar (1672-1731), French poet and playwright, born in Paris; was the author of *Inès de Castro* (1723), a tragedy; *Le Magnifique*, a comedy; and *L'Europe Galante* (1697), a ballet, all of which acquired considerable contemporary fame. Other works are a translation of the *Iliad* (1714); *Réflexions sur la Critique* (1715); *Fables* (1719); *Odes* (1707). His *Œuvres* were published in 10 vols. (1754). See Jullien's *Les Paradoxe littéraires de La Motte* (1859).

La Motte Fouqué. See FOUQUÉ.

Lamotte, JEANNE DE LUZ DE ST. REMY DE VALOIS, COMTESSE DE (1756-91), French adventuress; married one Lamotte, and by playing upon the Cardinal de Rohan's infatuation for Marie Antoinette, obtained through

him a diamond necklace worth 1,800,000 francs, with which her husband absconded. Rohan was disgraced, and Lamotte whipped and branded. She fled to England, where she published her *Mémoires* (1788; Eng. trans. 1788).

Lamoureux, CHARLES (1834-99), French violinist and conductor, born at Bordeaux. In 1881 he instituted the famous *Concerts Lamoureux*, and was the leader of the Wagnerian movement in France.

Lampblack is a finely divided soot formed by the incomplete combustion of carbon compounds, such as heavy oils or pinewood. It consists chiefly of carbon with about 10 per cent. of complex hydrocarbons, and is mainly used in the preparation of printing ink.

Lampedusa (anc. *Lopadussa* or *Pelagia*), isl. in the Mediterranean between Tunis and Malta. Area, 11½ sq. m. Has belonged to Giggentia prov., Italy, since 1843. Produces fruit and grain. Pop. 1,200.

Lampeter (Church of St. Peter), or LAMPETER-PONT-STEPHEN, munic. bor. and mrkt. tn., Cardiganshire, Wales, on the Teifi, 23 m. N.N.E. of Carmarthen; contains St. David's College, founded in 1827, affiliated with the Universities of Oxford and Cambridge. Pop. (1901) 1,722.

Lampart and Holt Steamship Line, properly known as the Liverpool, Brazil, and River Plate Steam Navigation Company, was founded in 1865. It owns twenty-nine steamers, aggregating 148,000 tons, which run from London and various provincial ports to S. American ports, and also between New York and Manchester. Many of them are fitted up as passenger steamers, but the company is chiefly engaged in carrying cargo, horses, and cattle.

Lamprey, an animal which, though often regarded as a fish, differs from a fish in the absence of paired fins and scales, in the rounded suctorial mouth without supporting jaws, in the presence of gill-pockets in place of the gills of fish, as well as in numerous internal peculiarities. In consequence, the lamprey and the related hag are placed in a distinct class known as cyclostomes, or round mouths. Three species occur in British waters, all belonging to the genus *Petromyzon* ('stone-sucker'). One of these, *P. marinus*, lives in the sea, and exceeds three feet in length; while the other two are fresh-water forms, and are much smaller. To these two species, *P. fluviatilis* and *P. planeri*, the name lampren is often applied. In all cases the body is elongated and eel-like, its most con-

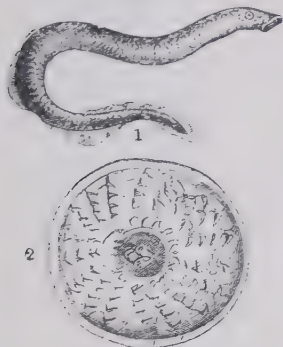
spacious feature being the seven slits on either side of the neck which communicate with the gill-pockets. The mouth resembles that of the hag in the presence of a muscular rasp known as the tongue. The food consists of all sorts of small animals, as well as of the dead bodies of larger ones, and even of the flesh and blood of living creatures, to which the lampreys attach themselves after the fashion of the hag. They also attach themselves by their mouths to stones, whence the generic name. Internally there is much general resemblance to

amples as the simple grease or tallow lamps used by engineers and miners in non-fiery mines, certain lamps for railway purposes, use at sea, etc. Such oils have been largely supplanted by mineral oils, derived from petroleum or shale, which are of about '80 to '82 sp. gr., and in Great Britain may not be of lower flash-point than 73° F., are very cheap and yield a good light, so that they are not only almost the only illuminant in country places, but also still hold an important position in towns, particularly among the poorer classes—though in the latter case the introduction of penny-in-the-slot meters, both gas and electric, is having a considerable effect in reducing their use. Lamps for this type of oil should be so constructed as not to be fragile, not to allow the oil in the container to become heated, to go out and not allow the oil to escape when upset, and to be extinguishable without blowing. They are used with closely-woven wicks that are either flat or tube-shaped, often two and sometimes three of the former being used side by side, whilst the latter may be built up of a series of small round wicks arranged in a circle, or by a bent-up flat wick. As paraffin or kerosene oils require to be burned with a good supply of air in order to give as white a light as possible and prevent smoking, a draught is usually provided by a glass funnel or chimney of more or less cylindrical shape, and is guided by a dome over the wick-holders so as to flow in a current parallel to and round the flame from its base. In order to avoid the necessity for a chimney, with its fragility and constant need of attention to keep it clean, lamps such as the Hitchock have been devised, in which the draught is provided by a fan driven by clock-work in the base of the lamp. With the circular wick lamp the air-draught is introduced on Argand's principle both to the inside and outside of the flame, which is also made more effective by being spread out into the shape of an inverted cone by fixing a circular disc of metal of about the diameter of the wick a short distance above the base of the flame. Large sizes of both circular and flat wick lamps are also used for heating as well as for lighting.

Spray and Vapour Lamps.—In the Lucigen type of lamp, used by contractors for temporary night-work out of doors, the crude shale or creosote oil used is held in a strong iron cylinder. Air is forced into the space above the oil by a hand pump to a pressure of about 25 lbs. per sq. in., thus driving the oil up a pipe that extends from the bottom of the tank to

the burner. Here it passes through tubes heated, when the burner is in action, by the flame itself, or when starting by burning some oily waste round them, so that it escapes from the jet partly as spray and partly as vapour, and burns with a rough and roaring but brilliant flame. The lamps used by plumbers and painters are on a very similar plan, but the oil, either paraffin or benzoline, is completely vaporized, and the jet of vapour mixed with air, so that it burns with a non-luminous flame like that of a blow-pipe. Vapour lamps for indoor lighting may be divided into two classes—*viz.* those that owe their light to the finely divided carbon particles set free by the decomposition of the hydrocarbon in the flame, and those in which the flame is on the bunsen principle, and consequently non-luminous, but which heats up a mantle of refractory oxides to incandescence. Examples of the former type are given in the benzoline lamp, in which the vapour from a volatile petroleum spirit issues from small holes in the burner, and is ignited; and in the naphtha lamp used on street stalls and the like, in which a somewhat less volatile spirit is led from a tank by a pipe to a perforated burner at a lower level, by which, after a little preliminary heating, the naphtha is vaporized, and burns with a rough and not readily extinguished blaze. The most successful vapour lamps in which a mantle is used are those fed either with alcohol or light petroleum spirit. In the alcohol lamps, of which the 'Sol' is a good type, the spirit flows from a reservoir through a tube, which, when the lamp is in action, is heated by the flame itself, but on starting requires to be warmed up by an auxiliary flame. In its passage through this tube the alcohol is vaporized, the vapour being led to the jet of a bunsen burner similar to that of an incandescent gas burner, where it mixes with air, and ignites a mantle in the same way. Similar lamps are constructed to be used with gasoline.

The petrol lamp on the 'Not-kin' principle requires a very volatile petroleum spirit of sp. gr. not exceeding .7, with the advantage that the spirit does not require to be vaporized by heating, being sufficiently volatile of itself. In the original type of this lamp the petrol is soaked into a porous block of kieselguhr and plaster of Paris contained in a metal case. The heavy vapour given off from the petrol flows, along with some air, down a pipe fitted to the lower part of the case to the jet of a bunsen burner, where it



Lamprey.

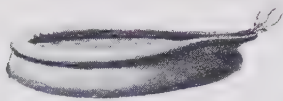
1. Sea lamprey (*Petromyzon marinus*). 2. Enlarged view of mouth.

the hag; but the lamprey has well-developed eyes, and has a delicate series of cartilages known as the branchial basket-work, which supports the pharynx. The adults die soon after spawning; the young, which in many respects differ from their parents, were formerly placed in a separate genus as *Ammocoetes*.

Lamprophyes are a group of igneous rocks which are usually found filling dykes, and are characterized by their dark colour and the abundance of crystals of biotite and hornblende. They do not typically contain porphyritic crystals of felspar, and this is one of the features which distinguish them from the porphyrites.

Lamps, from the point of view of this article, will be taken as including the more or less portable and self-contained devices in use at the present day for producing light, and to a less extent heat, by combustion; thus excluding electric lamps (see ELECTRIC LAMPS) and burners in which coal gas is consumed.

Wick Lamps.—Whilst formerly lamps of this type were almost invariably fed by oils of animal or vegetable origin, such as sperm and rape oils, consumed at loose cotton wicks, lamps using these oils are now nearly obsolete, their survivors including only such ex-



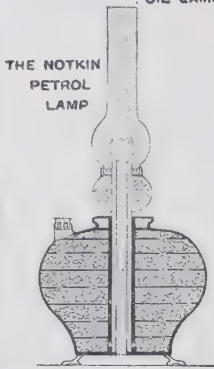
EARLIEST FORM OF
OIL LAMP



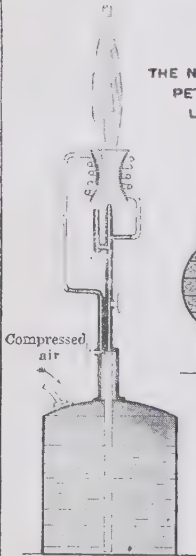
LAMP OF
EARLY CHRISTIANS



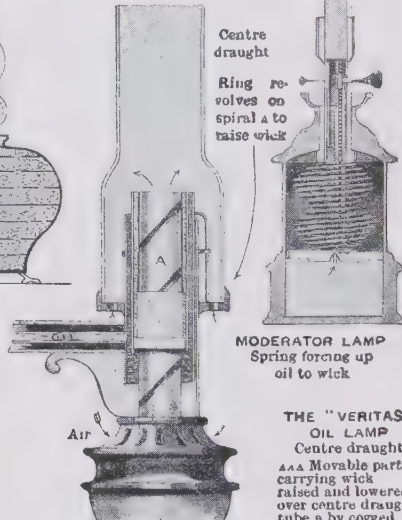
ETRUSCAN LAMP
Three wicks



THE NOTKIN
PETROL
LAMP

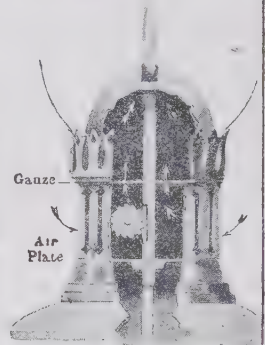


THE LUCIGEN LAMP



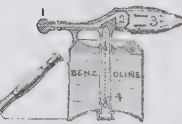
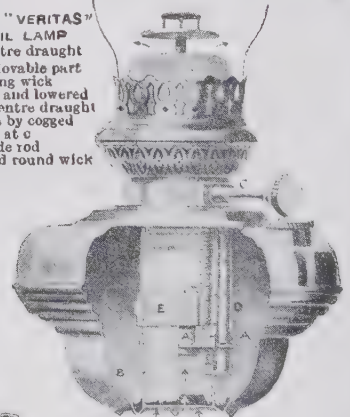
ARGAND'S LAMP

MODERATOR LAMP
Spring forcing up
oil to wick



PRINCIPLE OF PARAFFIN LAMP

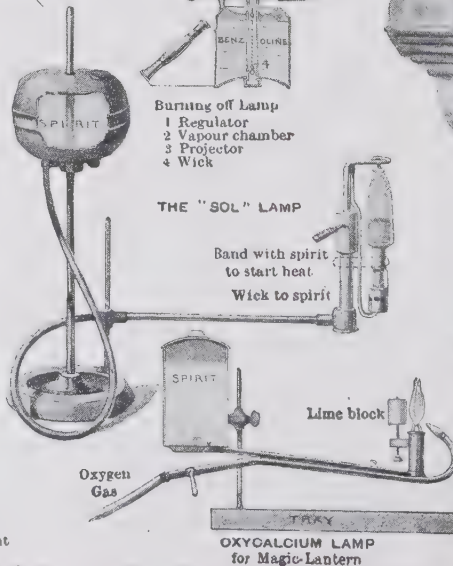
THE "VERITAS"
OIL LAMP
Centre draught
AAA Movable part
carrying wick
raised and lowered
over centre draught
tube a by cogged
wheel at c
d Guide rod
e Band round wick



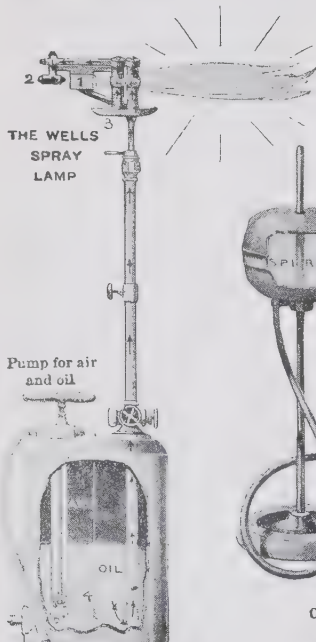
Burning oil lamp
1 Regulator
2 Vapour chamber
3 Projector
4 Wick

THE "SOL" LAMP

Band with spirit
to start heat
Wick to spirit



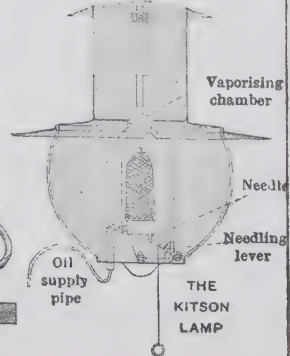
OXYCALCIUM LAMP
for Magic-Lantern



THE WELLS
SPRAY
LAMP

Pump for air
and oil

1 Air cone 2 Jet hole
3 Paraffin dish for starting light
4 Gauge rod



THE KITSON
LAMP

mixes with more air, and is burned in a mantle. In later forms of the lamp the reservoir is placed below, the draught of the chimney surrounding the mantle, first started by a match, and afterwards kept up by the flame itself, being sufficient to draw the combustible mixture into the special form of bunsen burner used. This type of lamp has the disadvantage that such spirit as is suitable, besides being very inflammable, is also expensive. Many lamps using ordinary paraffin oil vapour to ignite a mantle have been devised, though without perfect success. In one of the most successful the oil is supplied to an annular wick, at which it is burnt for a few moments to heat a disc of metal. The wick is then turned up to the hot metal, with the result that the oil is converted into vapour, which when burnt, mixed with air, ignites a mantle, sufficient heat being given out to keep the metal hot and continue the process.

The only lamps coming within the definition that consume what may be strictly called gas are those burning acetylene, as, although this gas is usually supplied from a central installation of greater or less size, it can also be prepared in a generator contained in a portable lamp, and is much used in this way to produce the brilliant light used on bicycles, motors, optical lanterns, fishing operations, etc.

For these purposes the calcium carbide is usually contained in a gas-tight receptacle, to which water is added drop by drop from a finely adjustable needle or other valve—a process which, though less satisfactory than the method of adding the carbide to water, serves well enough for intermittent use. The gas is filtered and consumed at a special form of seatite burner which is so constructed as to cause two fine jets of the gas, issuing from fine holes some distance apart, to impinge on each other and form a flat flame in a plane at right angles to their direction.

For lamps used in fiery mines, flour mills, petrol stores (Regulations under 59 and 60 Vict. c. 36, s. 5, 1896), and such places where the atmosphere may become explosive from admixture with inflammable gas or vapours, see SAFETY LAMP.

Lighthouse lamps are of the circular wick type, usually with three or more concentric wicks. They burn paraffin or petroleum oil of high specific gravity and flash point (125° F. for petroleum, and 140° F. for paraffin), which is pumped up to the wicks by a mechanism driven by a falling weight, and burns with a light

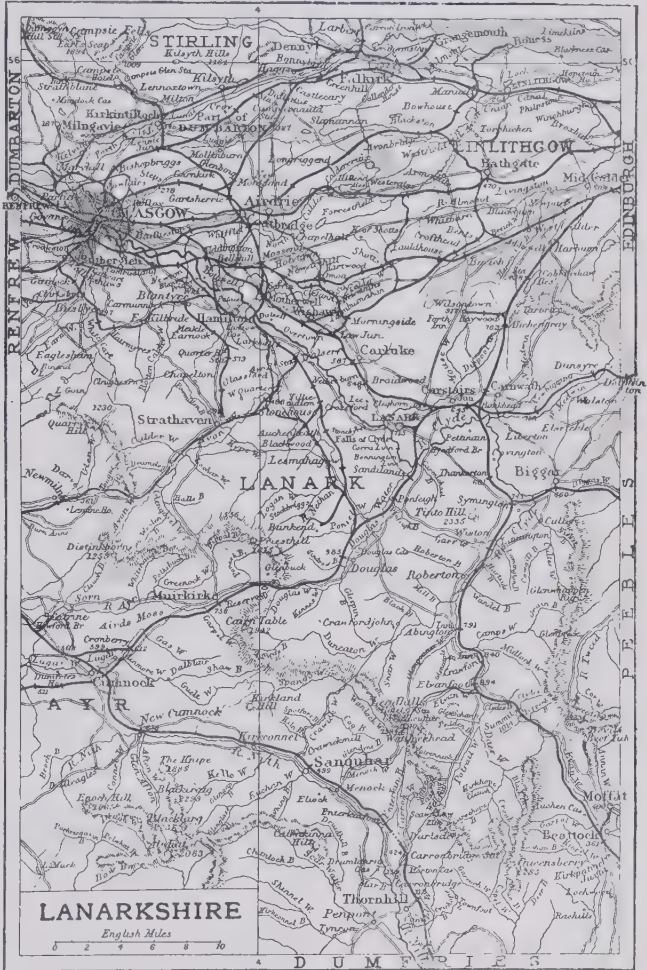
of great intensity and fog-penetrating power.

Candle lamps are much used for carriage lamps, reading lamps, and decorative purposes. They simply consist of a case containing a spring by which a hard candle is forced up to a perforated cap through which the wick passes.

Lamps, ELECTRIC. See ELECTRIC LAMPS.

Lamp-shell. See BRACHIOPODA.

Lampyrus. See GLOW-WORM.
Lamu, isl. off the coast of, and included in, British E. Africa, about 24° S., separated from the mainland by a narrow channel, and from Manda I., to the E., by a channel somewhat broader and deeper; 6½ m. long by 3 m. broad. The town and port of Lamu, on



Lampsacus, now **LAPSAKI**, important city of ancient Phrygia, Asia Minor, on the S. coast of the Hellespont. It was a place of flourishing trade; and when it belonged to the Athenian empire during the 5th century B.C., it paid twice as much tribute as Ephesus. See Murray's *Handbook for Asia Minor* (1895), and Wilson's *Asia Minor*.

the eastern shore, opposite Manda Island, is the headquarters of the administrator of Witu district. By regular lines of steamships it is in communication with Zanzibar, Europe, and India. Pop. 7,000.

Lanaria, a genus of the order Hemodoraceæ, containing only one species, *L. plumosa* is a South African herbaceous, per-

ennial plant growing to about a foot in height, bearing white, feathery flowers, with a six-partite perianth.

Lanark, co. tn., par. (10,390 ac.), and roy. bor., S. Lanarkshire, Scotland, on the high ground half a mile above the r. bk. of the Clyde, and close to the famous falls, 31 m. S.E. of Glasgow. The district is rich in Wallace associations. Manufactures druggot and wincey, and has large cattle and sheep market. The racecourse is about 1½ m. E.S.E. of the town. Pop. (1901) 6,640. At New Lanark, 1½ m. S.W. of Lanark, in 1783, David Dale and Arkwright founded a cotton mill of which Robert Owen, the social reformer, was long manager. Pop. 795.

Lanarkshire, inland co. of S.W. Scotland, having Dumbar-ton, Stirling, and Linlithgow shires on the N., Edinburgh and Peebles on the E., Dumfries on the S., and Ayr and Renfrew on the W. Area, 562,821 ac., or 879 sq. m. In population it ranks first among Scottish counties, having in 1901 a population of 1,339,327, an increase of 912,355 over that of 1841. It is drained by the Clyde and its tributaries the Douglas, the Nethan, the Avon, the Cadder, and the Kelvin, and is sometimes called Clydesdale, but this name is properly applied to the central valley. The county is divided into three wards—Upper, Middle, and Lower. The Upper or S. Ward is nearly twice the size of the Middle and eight times the size of the Lower, and its hilly and moorland character accounts for its sparser population; has large dairy and sheep farms; oats, barley, and a little wheat are grown in the cultivated valleys. Tinto (2,335 ft.) and Green Lowther (2,403 ft.) are the highest hills. The county is celebrated for its breed of heavy working horses (Clydesdales). The Middle Ward is more lowland in character, with high hills in the S.W. and elevated moorland in the N.E. The central valley has long been renowned for its orchards. Strawberries, currants, gooseberries, and tomatoes are produced on the 'braes.' The ward is closely identified with the mining and iron-working industries. The Lower Ward is more level, and is the busiest and most populous; it contains the chief seats of the cotton, linen, and woollen industries; the coal and ironstone mines, fireclay beds, blast furnaces, rolling mills, shale mines, and oil works. The N. part of the shire is of Carboniferous age, and its sandstone and limestone quarries, its shale, coal, and blackband ironstone mines and fireclay beds, make it the richest mineral field in Scotland.

The large deposits of coal and the nearness of the Clyde ports have made possible the enormous development of the cotton, flax, and woollen manufactures, and of the iron-working and kindred industries in and around Glasgow. The principal manufacturing towns are Glasgow, Govan, Partick, Coatbridge, Airdrie, Hamilton, Motherwell, Wishaw, and Rutherglen; coal and fireclay are worked round Shettleston, Baillieston, Airdrie, and Coatbridge. The county is divided into six parliamentary divisions—Govan, Partick, N.W., N.E., Mid, and S. Glasgow was, in 1893, made a county of a city, and is also a royal burgh; Lanark and Rutherglen are the other royal burghs. Lanark is the county town. Historically interesting are the castles of Craignethan, Bothwell, Douglas, and Dalziel; and the battlefields of Langside, Drumclog, and Bothwell Brig. See Leslie's *Scotie Descriptive* (1578); Irving's *Upper Ward of Lanarkshire* (1864); Maidment's *Topographical Collections in the Mitchell Library*, Glasgow; Cochran-Patrick's *Early Records Relating to Mining in Scotland* (1878).

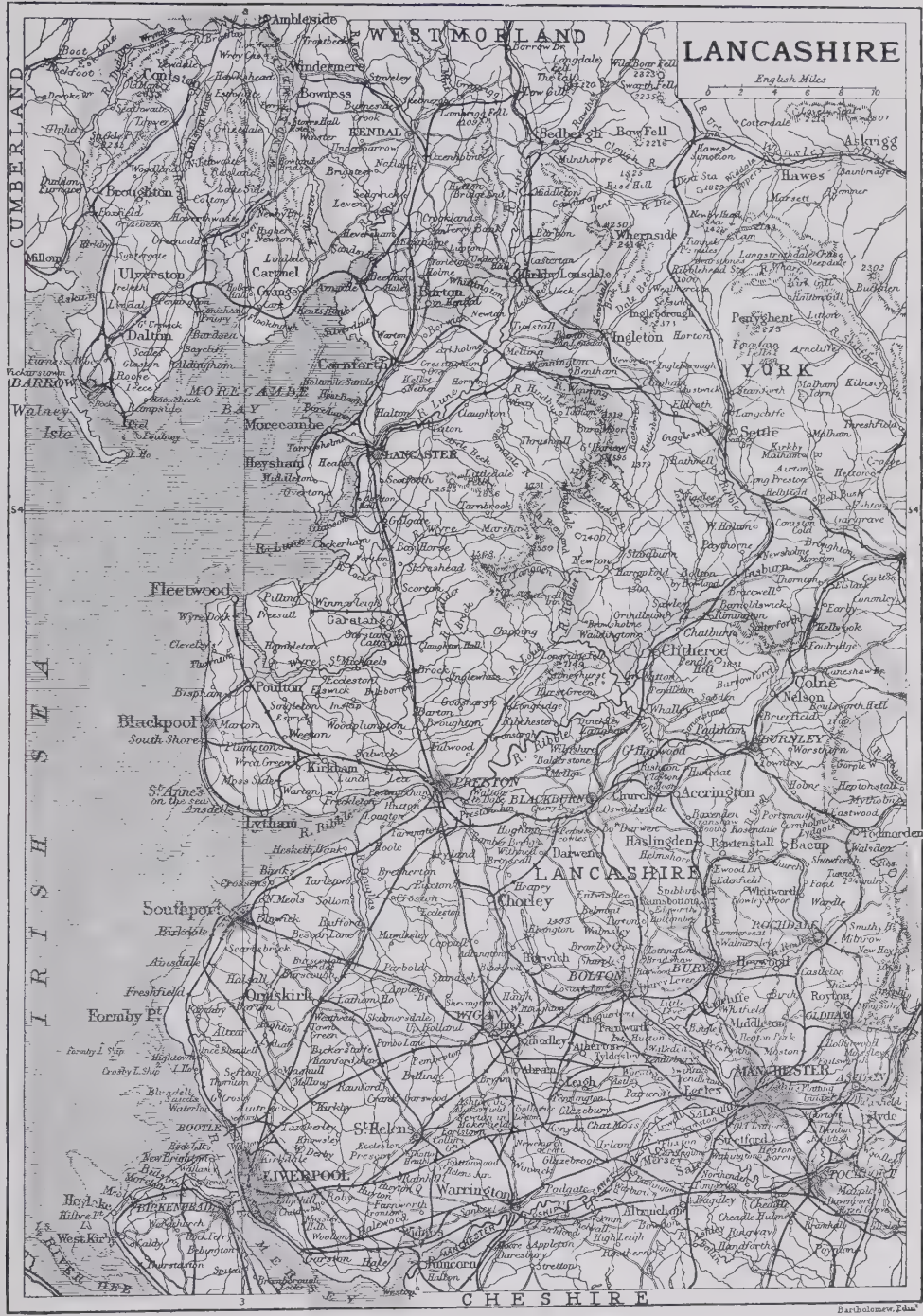
Lancashire, large maritime county palatine, in the west of England, lying chiefly between the Mersey and Morecambe Bay, with a detached portion (Furness) N.W. of the latter, between Cumberland and Westmorland. This N. section resembles in physical character the adjacent counties, and forms part of the Lake district. Off the S.W. extremity is Walney Isle. The surface of the detached portion is mountainous. In the main body, the E., bordering on Yorkshire, is hilly, with wide moorland tracts; the centre is undulating; and the W. is generally low. The principal rivers are Duddon (N.W. border), Crake, Leven, Douglas, Lune, Wyre, Ribbles, and Mersey, with Irwell. In the N.W. are Windermere (part), Coniston, and Esthwaite lakes. The county is traversed by a network of railways, and internal communication is further promoted by the canal system inaugurated by the Duke of Bridgewater in the 18th century. The Manchester Ship Canal, opened 1894, enables ocean vessels to ascend to Manchester. Liverpool and Manchester have a very large foreign trade; that of the former is second only to London. The principal crops are oats, wheat, and potatoes; cattle and sheep are reared, and there are many dairy farms. The county contains valuable deposits of coal and iron; the latter, a rich hematite, being worked in the Furness district. The chief coal fields are S. Lancashire and Burnley, with an out-

put in 1902 of 24,440,719 tons, while the production of pig-iron exceeded 640,000 tons. Other minerals are salt (rock and brine), limestone, and sandstone, the mines and quarries together giving employment to nearly 100,000 persons. Lancashire is the seat of the cotton manufacture (Manchester the centre); other industries include iron works (Ulverston, Warrington, Manchester), chemicals (Widnes, Runcorn), plate and other glass (St. Helens), leather and tanning (Warrington), shipbuilding (Liverpool, Barrow, etc.). The county is divided into six hundreds, and returns twenty-three members to Parliament.

Lancashire was constituted a palatinate by Edward III. (1363), and for a long time it enjoyed almost sovereign privileges. During the civil war it was the scene of various military events, and in 1745 the young Pretender marched southward through it. Besides Roman remains, there are ancient castles (Lancaster, Clitheroe), halls (Hulme, Speke), and abbeys (Furness, Whalley). Area, 1,887 sq. m. Pop. (1901) 4,406,787. See Baines's *Lancashire and Cheshire* (1868-9); Croston's *Historic Sites* (1883); Fishwick's *Hist. of Lancashire* (1894); Mortimer's *Industrial Lancashire* (1897); Harrison's *Archaeological Survey* (1896); *Transactions of Lancashire Antiquarian Society*, and of *Lancashire and Cheshire Historic Society*.

Lancashire and Yorkshire Railway. This railway was incorporated in 1847, being an amalgamation of the Manchester and Leeds (1836) and other railways, and twelve years later the E. Lancashire Railway was also amalgamated. The mileage either wholly or partly owned by the company (1904) was 576½, the chief lines extending from Manchester to Liverpool, Southport, and Blackpool on the W., and to Doncaster and Goole on the E. coast, and as far north as Hellifield. The company serves a thickly-populated manufacturing district, and during the half-year ending December 1904 carried over 58 million passengers, exclusive of season-ticket holders. The Liverpool, Crosby, and Southport line, and on to Crossens (about 21½ m.), is worked as an electric railway. The dividend for the years 1903 and 1904 was at the rate of 3½ per cent. per annum.

Lancaster. (1.) Municipal bor. and port, Lancashire, England, 21 m. N.W. of Preston. The castle, now the assize and county court and jail, on the site of a Roman station, was erected during the Norman period, and



LANCASHIRE

English Miles

CHEESHIRE

Bartholomew, Edm.

restored by John of Gaunt. The church of St. Mary is ancient. Manufactures furniture, linoleum, and railway plant. Area, 3,160 ac. Pop. (1901) 40,329. See Fleury's *Time-Honoured Lancaster* (1891), and Roper's *Guide to Lancaster* (1900). (2.) City of Pennsylvania, U.S.A., cap. Lancaster co., on the Conestoga R., 70 m. from Philadelphia. It is on the Pennsylvania and the Philadelphia and Reading railways. Manufactures cotton goods, machinery, cigars, and cigarettes. Pop. (1900) 41,459. (3.) City, Fairfield co., Ohio, U.S.A., 30 m. S.E. of Columbus, on Hocking R. The district is richly agricultural, and is in the natural-gas belt. Manufactures agricultural implements, flour, shoes, and glass. Pop. (1900) 8,991.

Lancaster, DUCHY OF AND HOUSE OF. Henry III.'s second son, Edmund, was the founder of the house of Lancaster. His son, Earl Thomas, took a leading part with the barons in checking the misgovernment of Edward II., and after beheading Gaveston and banishing the Despencers, was himself executed at Boroughbridge (1322). His nephew's second daughter and co-heiress, Blanche, married her cousin, John of Gaunt, fourth son of Edward III., in 1359, when the king formed Lancaster into a county palatine. The duchy was far more extensive than the county palatine, and had estates belonging to it in many other counties. Edward III. hoped, by adopting this family-settlement policy, to gradually annex to the English crown all the great estates in England. Possessed of a vast extent of territory, John of Gaunt, it was suspected, aimed at securing the English crown on the death of Edward III. His son, Henry of Lancaster (Bolingbroke), however, deposed Richard II., and was the first of the Lancastrian dynasty. With Henry VI. England's troubles began. The wars of the Roses broke out, and 'the lack of governance' became so evident that the trading classes advocated the succession to the throne on the death of Henry VI. of Duke Richard of York. The death of the latter, however, at the battle of Wakefield rendered a compromise impossible, and after the battle of Towton Edward of York (son of Richard) was able to maintain himself on the throne as Edward IV. The house of Lancaster fell, not on account of any better title brought forward by the Yorkist house, but because Henry VI. was incapable, and unable to give the country order and good government. The duchy of Lancaster is now annexed to the crown, and the chancellor-

ship of the duchy is a political appointment, and usually held by a cabinet minister. The revenue of the duchy in 1903 was £102,705. See Stubbs's *Constitutional Hist. of England*; Baines's *Hist. of Lancashire*.

Lancaster, SIR JAMES (d. 1618), navigator, sailed with an unsuccessful expedition to the E. Indies (1591). In 1596 he captured Pernambuco in Brazil; and in 1601 gave the new East India Company its first footing at Acheen and Java. Hewas knighted by Elizabeth, and having suggested the North-West Passage, Lancaster Sound was named by Baffin in his honour. See *Voyages of Sir James Lancaster*, edited for the Hakluyt Society by Sir Clements R. Markham (1877).

Lancaster, a British first-class cruiser, launched at Newcastle (1902). The name of the capital of Lancashire was introduced as a naval ship-name in the first year of the 18th century, and has since been associated with the relief of Denia (1808), Byng's action off Minorca (1756), the capture of the *Comte de Gramont* (1757), the battle of Camperdown (1797), and the operations in the river Plate (1807).

Lancaster Sound, channel, Arctic regions, connecting Baffin Bay and Barrow Strait; was discovered by Baffin (1616) and traversed by Parry (1819).

Lancelot. See AMPHIOXUS.

Lancelot du Lac, the son of King Ban of Benoic, a knight of the Round Table and lover of Queen Guinevere. Though probably better known to modern readers than any other hero of the cycle, Lancelot belongs exclusively to the later stage of Arthurian romantic evolution. Lancelot became, by the daughter of King Pellès, the father of a son, Galahad, who should be the winner of the Grail—a feat which, as the unlawful but faithful lover of Guinevere, Lancelot himself could not achieve. So far as we can tell, we possess the story only in a late and over-elaborated form; traces of an earlier redaction, in which it was closely connected with the *Perceval* story, are, however, apparent.

Prose *Lancelot* printed editions, Jehan le Bourgois and Jehan Dupré (1488); Ant. Verard (1494); Philippe Lenoire (1513, 1533); Jehan Petit (1533). *Roman van Lanceloet*, ed. Jonckbloet (2 vols. 1850), Dutch verse translation of the latter part of the prose *Lancelot*; *Romans de la Table Ronde*, M. Paulin Paris; *Lancelot*, Ulrich von Zatzikhoven, ed. Hahn (1845); *Le Chevalier de la Charrette*, Chrétien de Troyes, ed. Förster (1899); *The Legend of Sir Lancelot du Lac*, J. L. Weston, in Grimm Library, vol. xii.

Lancers, cavalry regiments carrying light lances, introduced into European warfare by Napoleon, and adopted by Britain about 1815. The lance is borne by foreign regiments not so named—e.g. dragoons and uhlans. The British regiments of lancers are the Royal Irish, Queen's Royal, Prince of Wales's Royal, Queen's, Duke of Cambridge's Own, and Empress of India's. There are two forms of lances used in the British army, with staves of ash and bamboo respectively. In the German and other continental armies lances with staves of tubular steel are largely employed.

Lancet, THE, one of the leading British medical journals, was founded in 1823 by Thomas Wakley, surgeon, who, with fierce and indomitable zeal, set himself to attack the grosser abuses of practice and administration in connection with the hospitals. Wakley began by reporting the medical lectures at the hospitals, and describing the important cases that occurred there. After the administration of the hospitals, Wakley turned his attention to the Royal College of Surgeons, and, later, the relations of insurance companies to medical men, which led to the founding of the New Equitable Insurance Company. In 1851 the *Lancet's* analytical sanitary commission was started to report on the food-stuffs and fluids in general consumption; and the fearless exposure of adulteration and fraud in *Food and its Adulterations* (1855) led to legislation in 1860. Wakley was assisted in the early days of the *Lancet* by William Cobbett, James Wardrop, and Sir William Lawrence, and later by Dr. Arthur Hill Hassall. The *Lancet* commissioners inquired into the state of workhouse infirmaries in London (1865) and in the country (1867). The paper is at present edited by his son, Mr. Thomas H. Wakley, and by his grandson, Mr. Thomas H. Wakley, jun.

Lancewood is the wood of certain trees belonging to the genus Guatteria, a subdivision of the order Anonaceæ. The so-called white lancewood is the product of *G. laurifolia*, but the bulk of the lancewood used by coachbuilders for shafts of traps consists of the main stems of the W. Indian *G. virgata*. It is very tough and elastic.

Lan-chau-fu, cap. of prov. of Kan-su, China, on r. bk. of Yellow R. It is the residence of the viceroy of Shen-si and Kan-su. Manufactures cloth and camel's-hair goods. Trade in silk, fur, metal, and wooden articles, grain, and tea. Pop. about 80,000, chiefly Mohammedans. See Rockhill's *Land of the Lamas* (1891).

Lanciani, COMMENDATORE RODOLFO AMADEO (1847), Italian archaeologist, born at Rome. He became secretary to the Roman Archaeological Commission (1872), director of excavations (1878), and professor of ancient topography, University of Rome (1883). He has superintended all recent Roman researches of importance. His great work, *Forma Urbis Romæ*, a plan of classic Rome in 46 plates, with historical text, was begun in 1892. Among his other publications are *I Commentarii di Frontino intorno le acque et gli Acquedotti* (1880) and *L'itinerario di Einsiedlen* (1891). Several of his books have been translated into English.

Lanciano (anc. *Anzenusa* or *Anzanum*), tn., Chieti prov., Abruzzi e Molise, Italy, 15 m. S.E. of Chieti; the seat of an archbishop. Produces grain, fruit, and oil, and has silk, linen, and hemp factories. Pop. of comm. (1901) 18,528.

Land. Economists have generally employed the term land in a technical sense, differing more or less from the ordinary usage. They have, on the one hand, extended the meaning to include all the resources which nature offers to man. Thus land includes the mines as well as the soil, the fisheries and the navigable rivers, the water power and the trade situation, as well as the natural properties of the soil. On the other hand, they have limited the term to the original and indestructible qualities of the soil, and with this usage we now deal.

Land as a factor in production is subject to a peculiar law which has been of enormous importance in determining the course of human development. This is the law of diminishing returns, which enunciates the fact that land will not go on indefinitely yielding returns to human labour. This law, however, is not peculiar to agriculture.

The condition that makes the law peculiarly the law of agricultural industry is that the quantity of land available is at any given time limited. When the extension of a given factory becomes unprofitable, a new factory can be built which will be at least as good as the original; but in agriculture good land is strictly limited, and recourse must be had to inferior land if it is desired to continue producing. Good land, as men estimate it, according to their knowledge and their market, will always be first occupied, and as population increases recourse must be had to inferior land. But 'inferior' means nothing but 'less productive in proportion to the labour expended.'

Agriculture, which we take as typical of the various extractive industries connected with land, is also peculiar in this respect as an industry, that the advantages of large-scale production over small-scale production are by no means proved beyond doubt. In new countries the large farm has failed in most cases, and been broken up into manageable areas. With cattle and sheep ranches the case as yet is different; but in farming the tendency of a new country is towards moderately-sized farms, whose area is governed by the efficiency of the labour of the owner and his family.

The discussion of the relative merits of large and small farming arose at the end of the 18th century. At that time the advantages of large farming were dependent on the conditions of the time; but during the 19th century the gradual depopulation of the rural districts, and the consequent scarcity of agricultural labour, produced a change of opinion. The political cry now is, 'Back to the land;' and both from the political and the economic points of view, the system of small holdings has found many advocates. This change has been facilitated partly by the enactment of laws encouraging small holdings in England, but more by Irish land legislation.

Small farming would undoubtedly give the largest gross return, but at a disproportionate cost of labour; though, when the difficulties of providing suitable occupation for the hours in which the peasant proprietor is uneconomically engaged in cultivation are considered, it is possibly true that from the national point of view small ownership gives the best net returns.

The historical problems regarding the origin of property in land are discussed under the head **VILLAGE COMMUNITY**, and regarding the beginnings of land tenure in England under **MANOR** and **FEUDALISM**. The manorial system was gradually yielding before a money economy and being transformed into simple tenancy when the Black Death, by creating a scarcity of labour, so altered economic conditions that the landowners endeavoured to revert to the abandoned system, but without much success. The final result was the adoption of a transitional form of tenure. The landlord lacked labour, and the emancipated villein lacked capital to cultivate the land without help. The result was a stock and land lease which continued the system of tenure till a sufficiency of working capital had been amassed. This system was the natural result of the conditions. It reappears in American agricul-

ture as the system of cultivation by 'halves' or 'thirds,' where the tenant farmer pays the landowner one-half of the produce if the stock is provided with the land, and one-third when he himself provides the stock.

The great epochs in English land history are the two agrarian revolutions which occurred in the 15th-16th century and in the 18th-19th century. The first was due to the prosperity of the woollen industry, which induced the more enlightened to convert arable into pasture land, and to enclose great areas because of the greater clips of wool to be obtained from sheep fed in enclosed fields. This was the beginning of English capitalist tenant farming. Mercantilism as a national policy in the 17th and 18th centuries, in consequence of an export duty on corn, diverted agriculture from its exclusive attention to wool; but this did not affect land tenure to any great extent. The next agrarian revolution was also a period of enclosures, and it proved ruinous to small farmers, whose rights to commons were not always fully respected. The result was an enormous increase of produce from the land, due to improvements which became possible after enclosure. This revolution finally gave the character to English land-owning and farming. England is the classical home of the large farm and of the capitalist farmer.

Land legislation as applicable to England and to the fertile parts of Scotland has differed in character from that passed for the benefit of Ireland. Rack-renting has never been possible in England; it has in Ireland. Irish land legislation has taken up much of the time of Parliament, and much of the legislation has been passed to remedy evils created by earlier acts. Thus the great Irish Land Bill of 1881 endeavoured to give legal form to Ulster tenant right, and create a form of dual ownership. The Land Bill of 1903 completely wipes out all traces of dual ownership in favour of complete purchase at the guarantee of the state. At first the principle of land purchase was limited to the facilitating of voluntary transfers. Then the credit of the state was introduced to facilitate the transaction, and Irish tenants could purchase at an annual payment of much less than the rent that had been paid.

Land, PURCHASE AND HIRE OF, FOR MILITARY PURPOSES. It may be necessary, for various military purposes, to acquire land or buildings permanently or to hire them temporarily. In case of an invasion or for purposes

of defence, the Defence Act of 1842 empowers the Secretary of State for War to take possession of any lands or buildings required, simply by issuing an order to that effect, which is carried out after due notice to the owners. In ordinary times, lands or buildings required are usually purchased or hired by agreement between the War Office and the owners; but should agreement be found impossible, the Secretary of State, acting under the provisions of the Military Lands Acts of 1892 and 1900, may issue a 'provisional order' declaring his intention of compulsorily acquiring the land, and hold an inquiry, meanwhile submitting a bill to Parliament. If the bill passes into an act, the owner is compelled to give up the property on reasonable terms; but otherwise, if Parliament throws out the bill, the 'provisional order' is annulled.

Landau, tn., Bavaria, Germany, in the prov. palatine, 32 m. by rail s.w. of Mannheim. Has breweries, tanneries, and dyeing industries, and trades in tobacco, wine, and grain. The town gives its name to a four-wheeled carriage which was originally made there. Pop. (1900) 15,824.

Landaur, cantonnement and sanatorium, Dehra Dun dist., N.W. Provinces, India, 77 m. E. of Ambala, and 7,459 ft. above sea-level. Pop. 4,000.

Land Commissioners. These consisted of Copyhold, Tithe, and Inclosure Commissioners, who were given the title of Land Commissioners by the Settled Land Act, 1882. Their powers and duties under eighty-four different acts were transferred to the Board of Agriculture in 1889.



Land Crab of Jamaica.

Land Crab, a member of the family Gecarcinidae, and remarkable for the curious modification of the carapace in the region of the gills, which enables it to lead a terrestrial existence. The land crab occurs in the warmer regions of both hemispheres, but the best known form is *Gecarcinus viricicola* of Jamaica and the West Indian islands generally, whose habits, and especially the very curious migrations to the sea at the breeding period, have been described by Patrick Browne in *The Civil and Natural History of Jamaica* (1756).

Landeck, tn., Silesia, Prussia, on river Biele, 54 m. S. of Breslau;

has warm sulphur springs and mud baths. Pop. (1900) 3,526.

Landed Estates Court, a court constituted in Ireland by the Sale and Transfer of Land (Ireland) Act, 1858, s. 2, to which was transferred all the business of the Commissioners for the Sale of Incumbered Estates in Ireland. The court was merged in the Supreme Court by the Supreme Court of Judicature (Ireland) Act, 1877, and the judges of the Landed Estates Court became the land judges of the Supreme Court.

Landells, EBENEZER (1808-60), English engraver, born at Newcastle-on-Tyne; studied there under Bewick; settled in London in 1829, where he became originator and part proprietor of *Punch* (1841), for which he did much work. See Spielmann's *Hist. of Punch* (1895).

Lander, RICHARD LEMON (1804-34), English explorer, born at Truro; accompanied Clapperton's Niger expedition (1825), and on his return wrote accounts of it in his *Journal of Richard Lander from Kano to the Coast* (1829), and *Records of Captain Clapperton's Last Expedition to Africa* (1830). In 1830 Lander and his brother John (1807-39) were sent by the government to explore the lower course of the Niger. This they surveyed, and proved that it discharged into the Gulf of Guinea. During a later expedition to the Niger, Lander was killed by the natives. See his *Journal of an Expedition to Explore the Niger* (1832).

Landerneau, seapt., prov. Finistère, France, on river Elorn, 12 m. N.E. of Brest; has ship-building, tanning, woollen, linen, candles, paper. Pop. of comm. (1900) 22,745.

Landes, maritime dep., S.W. France, bordering on the Atlantic. It is divided into two parts by the Adour, the only river of importance in the department. The portion to the N., three-fifths of the department, is known as the *landes*, and consists of tracts of sand, interspersed with marshes, and forests of cork, pine, and oak. The part to the S., known as Châlosse, is hilly, and covered in large part by vineyards and plantations of oak; while along the river valleys maize, wheat, and timber are grown. Mining is extensively carried on, iron ore being the principal source of wealth. Rock salt is obtained at Dax and Escourrou. Area, 3,615 sq. m. Pop. (1901) 291,586. There are three arrondissements—Mont-de-Marsan (cap.), St. Sever, and Dax.

Landgrave, or COUNT, was originally an official sent out by the central authority to adminis-

ter a country district or *gau*. He acted as military leader, also as judge. After the break-up of the Carolingian empire the counts often became powerful local magnates, and from their castles frequently defied the royal authority. They became more and more independent, and eventually adopted the title of landgrave, or *comes terra*. The position of a landgrave was originally similar to that of a duke in Britain.

Landi, GASPARD (1756-1830), Italian painter, born at Piacenza; studied in Rome under Corvi and Batoni; was elected member of the Academy of St. Luke, of which he was president (1817-30). Landi's best works are the *Assumption* and the *Coronation of the Virgin*, in Piacenza Cathedral. As a portrait painter he achieved considerable success.

Land Laws. There can be no land laws until there is permanent use and occupation of the same land, and that does not take place till what has been called 'intensive agriculture' has been discovered.

According to the fully-developed modern notion of property, the essence of which is 'a definitely conceived indefiniteness,' the owner of land has the right to do with it anything that is not forbidden. He has the right of possession, and the right of user, and the right to sell it, let it, lend it, burden it, give it away, and, in England at any rate, to transmit it to others at his death. In all countries where the feudal system has prevailed no subject is theoretically the absolute owner of land, because the rule or fiction of law, commonly called the doctrine of tenures, vests the absolute property, or *dominium directum*, of all lands in the crown, and makes all land of inheritance in the hands of a subject to be held of some superior and under some real or supposed services and conditions annexed thereto by a supposed original grant. But the doctrine of tenures has now little effect on the enjoyment of property, however much it may determine the forms of conveyancing, or the machinery by which rights of property in land may be transferred, and the owner in fee simple of freehold land in England is for all practical purposes an absolute owner.

The two great divisions of the law with regard to land are concerned with enjoyment and transfer. As to the enjoyment of land, an owner in fee simple has the right of possession, and may use his land for any purpose so long as he does not interfere with the rights of others or create a nuisance. His rights extend up to the heavens and down to the centre of the earth, and he is

therefore entitled to exclude every one else from coming on the surface of the land, or from boring under it, or even from passing through the air above it. (See *TRESPASS*.) Many reformers have thought that the powers of owners of land to exclude the public from it are excessive. The theory of the law is, however, largely mitigated in practice by the fact that a trespasser, not in pursuit of game, is only liable to a civil action; and as damage can rarely be proved, the plaintiff has probably to pay the costs, and is put to serious expense without any advantage. Such actions are therefore rare, except when a claim of right is made. The protection of game, however, and especially the protection from disturbance of deer on the large tracts of uncultivated lands used as deer forests in the Highlands of Scotland, have led to a movement for restricting the rights of owners with regard to trespass. Bills have several times been introduced for the purpose of giving the public access to the picturesque scenery of uncultivated and mountainous districts, but they have not become law.

An owner is entitled to all that grows on the land either naturally or as the result of cultivation. He may erect buildings on the surface of the land to any height, and he may excavate it to any depth, subject to the obligation to give support to the adjacent land. He may extract minerals, or other things of value, and dispose of them for his own benefit, with the following exceptions: gold and silver mines and treasure trove belong to the crown. But the owner of the land may work mines of copper, tin, iron, or lead, even although gold or silver may be contained in the ore. In such cases, when the ore has been raised to the banks of the mine the crown may within thirty days take the ore upon paying the mineowner for the copper, tin, iron, or lead contained in it. Water on the surface of land—as, for example, a lake—belongs to the owner of the land; but in the case of water passing over land in a definite channel, such as a river or stream, his rights are restricted by the rights of those on to whose land the water flows, and he must not exhaust or pollute it so as to injure them. The owner of land may collect and take water which percolates through it and does not form part of a definite stream.

The owner of land may, of course, cultivate it himself, or he may let it to another at a rent. When he lets the land there arises the relationship of landlord and tenant, and important questions as to the policy of the land laws

are connected with this relationship. It is a matter of national interest that the land should be well cultivated, and, for this object, that the actual cultivator should have security of tenure, and full compensation for improvements; and that the rights reserved by the landlord, such as sporting rights, should not interfere with the proper cultivation of the land. To some extent these objects are sought to be attained in England and Scotland by the *Agricultural Holdings Acts* and the *Ground Game Act* (see *GAME LAWS*), and in Ireland by much of the recent land legislation. (See *IRELAND*.)

One great difficulty connected with the proper cultivation of the land is the question of farm buildings. These are generally erected by the owner, and, of course, they are of a more or less permanent nature. If large farm buildings are erected, as is generally the case in England, the land must for a long time be let in large farms, and this forms one of the chief difficulties in the way of obtaining small farms by men without much capital, who actually cultivate the land themselves, with the assistance, it may be, of their families, and who often succeed in getting much better results than the holders of large farms. On the other hand, the proper stocking of the farm, and the employment of expensive agricultural implements of a labour-saving kind, require capital which can only be provided by the large farmer. The formation of a class of small owners is thought by many to be a desirable object, and the legislature has endeavoured comparatively recently to give facilities for the attainment of this end (see *SMALL HOLDINGS*); but the general existence of farm buildings suitable for large farms, and other circumstances which will be referred to, form serious obstacles to the natural growth of a class of this kind.

As to an owner's power of disposition, he may confer upon others rights of a limited kind with regard to his land. He may license another to pass over his land, or to enter it in pursuit of game; or he may contract with another to use the land as a cricket ground or a racecourse, or to let boats for hire upon a lake. In none of these cases is any right of property transferred. On the other hand, he may grant the right to take some profit out of the land, as to cut turf, fell timber, or dig for gravel or clay; or he may grant positive or negative rights as appurtenant to adjoining property, such as a right-of-way or the right not to have the light of a building obstructed. (See *EASEMENT* and

SERVITUDES.) All such rights conferred upon others limit the owner's use of his land. Again, he may settle his land, which means that he may grant estates less than his own, such as a life estate, followed, it may be, by an estate tail, so as to give to a series of limited owners successive interests in the income and corpus of the property. But, in England at any rate, an owner's power of creating successive interests in land is limited by what is called the rule against perpetuities, which makes any disposition void which is not so framed that it must necessarily take effect, if at all, within twenty-one years of the death of some person living at the date of the settlement, if it is made by deed, or at the date of the testator's death, if it is made by will. This rule is in conformity with the policy of the law of England, which for hundreds of years has provided means by which a tenant in tail in possession can bar the rights of his issue and of all successive tenants in tail, and become an owner in fee simple. The object of the rule against perpetuities is to prevent the dead hand from resting too long on the land and unduly fettering its free user and disposition. To a large extent, however, the policy of the rule is defeated by the system of strict settlements, by which land is tied up from generation to generation by a series of resettlements, so that the person entitled to possession is always a limited owner, entitled only to the income of the property.

An owner may also burden his land by mortgaging or charging it as a special security for debt. The mortgaging of land, in so far as it is against public policy, is closely allied to the evils connected with settlements, under which the land is often heavily charged with jointures and portions for younger children.

An owner may also dispose of his land absolutely by sale or gift during his life, or may devise it by will at his death. In England, however, the power of sale, gift, or devise is limited as regards its objects by the *Statutes of Mortmain*.

If an owner does not dispose of his land in his lifetime and dies intestate, the land descends to the heir at law (subject to claims for curtesy, dower, and terce—as to which see *HUSBAND AND WIFE*). Males of equal degree of relationship succeed before females; and among males in the same degree, by the law of primogeniture, the eldest is the sole heir, to the exclusion of the others, and takes the whole of the land. Females in the same degree take as co-heiresses—in England called co-

parceners, and in Scotland heirs-portioners. It is a comparatively rare thing for the owner of any considerable estate in land to die without having made any disposition of it either by settlement or will, and therefore the actual effect of the law of primogeniture upon the descent of land is not great. But the influence of the existence of such a rule of descent is still very considerable, particularly in the case of large estates, and really governs the form of most family settlements of real property. The estate is kept together by giving it all to the eldest son, even when the rest of the family can only be provided for by seriously burdening the property.

The right of the state to take land compulsorily for public purposes is unquestionable, and many private acts of Parliament are passed every session authorizing the compulsory purchase of land for railways, street improvements, and a number of other objects. Full compensation to the owners has always to be paid, and is assessed in proceedings under the Lands Clauses Acts.

The fact that land is limited in amount and necessary for all has led to different proposals for expropriating the present proprietors and vesting the whole of the land in the state. It is said that the land belongs to the nation, and ought not to form the subject of private property, but that the state should be the universal landlord. Nationalization of the land, as it is called, of course forms one of the objects of a consistent system of socialism, which aims at transferring to the state the control of all the means of production; but it has also been advocated by persons who are not socialists, but would permit private property in capital of other kinds. They say that land is in a different position from other kinds of property—that it is not produced by industry but provided by nature; that its value is increased by the increase of population or the aggregation of population in particular areas, and that all the increase in value goes to owners who have done nothing to bring it about. Various suggestions have been made for redressing this alleged injustice, from the extreme view that all existing owners should be expropriated without compensation to proposals for taxing or rating future increments of value in particular cases.

We are not concerned here with a general scheme of socialism; and short of such a scheme it is clear that, if the present proprietors are to be bought out, either the present value of the land must be paid to them or the expropria-

tion will amount to confiscation of one kind of property only, which is an obvious injustice to the accidental possessors of that kind of property. The proposal of Mr. Henry George to tax rent up to its full amount is, of course, equally confiscation of a particular kind of property.

In the case of agricultural land a purchase at the present value would in all probability be a bad bargain for the state. The attraction of possessing landed property makes the price obtainable in the market high, often fully thirty years' purchase; and after that had been paid the state would still be burdened with considerable recurring expenditure upon roads, fences, drainage, and other improvements, which would reduce the net income to about two per cent., or a lower rate of interest than would have to be paid for the money borrowed to provide the purchase price. In the case of urban property there is often a large rise in value owing to the increase of population and the expenditure of the rates, and it has been proposed to give municipal authorities the right to purchase compulsorily the land in the neighbourhood of towns, so as to obtain for the public this increase of value. This is, however, a very speculative business, as it is not possible to foretell with certainty the direction in which the town will extend; and if the present value of the land is paid, it is only by correctly foretelling the future that an increased value can be secured.

The taxation or rating of land values is another scheme which has been advocated in recent years, notably by the London County Council and the Corporation of Glasgow. The proposal is to value the land in towns separately from the buildings upon it, and impose a separate rate upon the land or site value, the increase of which is said to be in the nature of unearned increment. Of course it is obvious that no new source of revenue would be reached by a separate valuation of buildings and sites, but it is suggested that the owner of the land or site value at present escapes rating, and can better afford to pay than the occupiers of the buildings. It is doubtful, however, if the owner of the site value really does escape rating in any case, and in some cases he clearly does not. But the question is too complicated to discuss in the space available, and those interested are referred to Mr. Sargent's book on *Urban Rating*, Professor Smart's *Taxation of Land Values* (1900), and the *Reports* (with evidence and appendices) of the Royal Commission on Local Taxation (1898-1902).

When local improvements are carried out in large towns—such, for example, as the construction of new streets through hitherto overcrowded areas—the property of particular owners is often benefited specially and out of proportion to the general benefit arising from the improvement. This special benefit, under the name of 'betterment,' is separately assessed and rated in American cities, and the principle has been introduced into this country in the case of some of the London improvements recently authorized by Parliament.

The transfer or conveyance of land in modern times is practically always carried out by means of deeds; and as in England these are purely private documents, it is necessary for a purchaser to have an investigation made of the history of the dealings with the land in order to make sure that he gets a good title. In the case of small pieces of land the expense of this is out of proportion to the purchase price, and is a serious burden on the buyer, and an obstacle to free dealing in land. The investigation is much easier in Scotland, where a very complete system of public registration of deeds has long been in force. It was long felt, however, by persons not hampered by professional prejudice, that something more than this was wanted, and that it would greatly simplify all transactions relating to land if the title could be examined once for all, and registered as an absolute title, so that all future dealings with the land could be effected by entries in a public register. After several unsuccessful attempts, and much opposition, principally from the legal profession, a system of compulsory registration of title has been introduced in England by the Land Transfer Act, 1897, and will gradually come into force over the whole country. See Maine's *Village Communities* (1876); Seebohm's *The English Village Community* (3rd ed. 1884); Jenks's *Law and Politics in the Middle Ages* (1898); Pollock and Maitland's *History of English Law before the Time of Edward I.* (2nd ed. 1898); Brodric's *English Land and English Landlords* (1881); Shaw-Lefevre's *Agrarian Tenures* (1893); Cobden Club Essays, *Systems of Land Tenure* (new ed. 1881); Boyd Kinnear's *Principles of Property in Land* (1880); Pollock's *The Land Laws* (3rd ed. 1896); Wallace's *Land Nationalization* (3rd ed. 1883); Henry George's *Progress and Poverty* (new ed. 1884); Williams's *Law of Real Property* (19th ed. 1901); Challis's *Law of Real Property* (2nd ed. 1892).

Land League. THE, established in October 1879, and suppressed in 1881 by Mr. Gladstone's government, was perhaps the most powerful of the many organizations to which agrarian agitation in Ireland has given birth. The principles of the organization were set forth in the following resolutions:—(1) 'That the objects of the league are, first, to bring about a reduction of rack-rents; second, to facilitate the obtaining of the ownership of the soil by the occupiers of the soil.' (2) 'That the objects of the league can be best obtained (a) by promoting organization among the tenant farmers; (b) by defending those who may be threatened with eviction for refusing to pay unjust rents; (c) by facilitating the working of the "Bright clauses" of the Land Act [1870] during the winter; and (d) by obtaining such reform in the laws relating to land as will enable every tenant to become the owner of his holding by paying a fair rent for a limited number of years.' Among the names prominently associated with the Land League were those of Charles S. Parnell, Michael Davitt (the real founder), John Dillon, Thomas Sexton, J. G. Biggar, James O'Kelly, and Patrick Egan. Under the Coercion Act of 1881, Parnell and other officials were arrested and confined in Kilmainham prison, and the league was proclaimed as an unlawful association.

Landlord and Tenant. This relation is generally created by a lease, or an agreement for a lease, which must usually be in writing. (See FRAUDS, STATUTES OF.) An agreement may be converted into a lease by an action for specific performance. A lease must begin at a certain date, and be either for a term of years or for lives. Leases contain covenants by the lessee, which vary in form, and should be carefully looked at, as they are sometimes oppressive. The ordinary covenants are:—(1.) To pay rent. Sometimes an increased rent is required if a certain act—e.g. ploughing up pasture—is committed. (2.) To pay rates and taxes. The landlord in all cases pays property tax and tithe rent charge; and he pays land tax, sewers rates, and special local assessments, unless this clause is inserted. The tenant, unless he has covenanted to pay landlord's taxes, may, and generally must, deduct them from his rent. (3.) To repair. This covenant admits of great variation; often the landlord does external and the tenant internal repairs. The covenant may be to put in repair, or to keep in good and tenantable repair, and often it is more specific, as, to paint at certain

times and seasons. If there is a covenant to repair *simpliciter*, without other provision, the tenant is liable to rebuild if the property is burnt down. (4.) To insure. The insurance must often be taken out in the landlord's name at a particular office. But a landlord who insures himself is not, in the absence of express provision, bound to rebuild if the premises are burnt down. (5.) Not to assign or underlet without the landlord's consent. This covenant is often very troublesome, and the tenant should insist that it should be provided that the consent should not be unreasonably withheld. A person cannot let his house even for a week in the London season under this clause without consent. But the landlord may not exact a fine for giving his consent. (6.) Not to carry on a trade, or to carry on a trade. In assignments, etc., especially of long terms, such covenants are often lost sight of, and should be inquired after, as they may be found very inconvenient. The covenant is often 'not to put up a brass plate.' (7.) Covenant against waste. (See WASTE.) The following covenants are implied: (1.) In an agricultural lease, that the lessee will work in a husband-like manner. (2.) In the case of a furnished house only, that the house is fit for habitation. The lessor covenants that he has a right to convey, will give quiet enjoyment, free from encumbrances, and that he will make any further assurance that may be necessary. A lease also contains conditions, which are distinguished from covenants in that a breach of the former makes the lease void, while a breach of the latter is only a ground for an action for damages. The Conveyancing and Law of Property Act, 1881, has restrained the harsh operation of conditions by giving the lessee an opportunity of rectifying any breaches before incurring a forfeiture. A tenant may still forfeit his lease by a disclaimer—i.e. by denying his landlord's title, and either claiming title himself or setting up the right of a third person. Mining leases contain many special covenants for securing the proper working of the mine and the protection of the surface. Leases are often the subject of assignment or underlease. An assignment conveys to the assignee the whole of the lessee's rights and liabilities; though, speaking generally, an assignee can only be required to perform those covenants which run with the land—i.e. covenants which benefit the estate, such as to repair, to insure, or not to carry on a trade. An underlease, however, creates

no relationship between the original lessor and the underlessee; and the lessee, though he may have parted with his whole interest except the last day of the lease, remains liable on his covenants.

In the case of tenancies where the term is not ascertained in the instrument creating the tenancy, a tenant is entitled to a reasonable notice to quit. If the tenancy is by the month or week, a month's or a week's notice is enough; if the tenancy is yearly, six months' notice must be given, *such notice expiring at the end of the year*. A half-year is 182 days; but if the tenancy is according to quarter day, the half-year is so reckoned.

In Scotland, as leases are only contracts, they were formerly not good against successors of the grantor by purchase or adjudication; but by an act of 1449 a tenant in possession was protected. To obtain the benefit of the act, the lease, if for more than a year, must be in writing, for a definite period, at a specified rent, though not necessarily a money rent, and possession must follow. The common period of an agricultural lease is nineteen years, but there is frequently a right to either party to determine the tenancy upon giving three years' notice. Trustees and limited owners have been given powers of leasing by many acts of Parliament. A tenant is entitled to the use and possession of the subject let, and to an abatement of the rent if part of the subject is destroyed or rendered unfit for use; he is not entitled, without consent, to change the use of the subject from that for which it was let. Except under the Agricultural Holdings Acts, all improvements made without express stipulation are made at the tenant's risk. A tenant is liable for taxes and public burdens, except probably in the case of a furnished house. The heirs and executors of a landlord and tenant are respectively liable for all unfulfilled obligations under the lease. Leaseholders are not liable to the widow's right of terce. See IRISH LAND LAWS, AGRICULTURAL HOLDINGS, DISTRESS, and FIXTURES; also Woodfall's *Landlord and Tenant*.

Landnáma-Bók (Book of the Taking of the Land), an Icelandic Domesday-Book, or chronicle, in five parts, treating of the discovery and settlement of the island, of its several quarters, and of the families by which each quarter was settled. It was compiled by Ari Fróði, the son of Thorgil, who died about 1150, and edited in Vigfusson and York Powell's *Origines Islandicæ* (1905).

Landon, LETITIA ELIZABETH (1802-38), English poetess, born at Chelsea, early contributed to the *Literary Gazette* and other journals. Her poetry, somewhat Byronic, written under the initials 'L. E. L.', is often pleasing; and her novels showed great promise. See *Life and Literary Remains*, by S. L. Blanchard (1841); and *Poetical Works*, edited by W. B. Scott (1873).

Landon, ARNOLD HENRY SAVAGE, English artist and traveller, grandson of Walter Savage Landon, was born in Florence, and educated there and at Paris. He spent several years in visiting Japan, China, S. Mongolia, Korea, and other countries, and his name will always be prominently associated with the two expeditions which took him into the Kurile Islands (1893) and into Tibet (1897). The story of his visit to and his stay among the primitive inhabitants of Yezo and the Kurile Is. he told in his interesting book, *Alone with the Hairy Ainu* (1893). The expedition into Tibet, both in its scientific and personal aspects, fixed public attention upon Landon in a very special way. It was begun in the spring, and was continued through the summer and autumn of 1897. His object was to penetrate into Lhasa, and through many difficulties, dangers, and hardships he succeeded so far in his enterprise as to come almost within sight of the sacred city. He reached a place called Toxem, where, through an act of treachery, he and the only two attendants who had remained with him out of all his following were made prisoners by the Tibetans. They were taken to Galsio, and both there and on the journey from Toxem they were subjected to a variety of tortures, which, in the case of Landon himself, left him a cripple for many months. A detailed account of the expedition, its geographical results and his personal experiences, was published in his great work, *In the Forbidden Land* (1898). Landon's publications include *Korea, or Chosen, the Land of the Morning Calm* (1895); *China and the Allies* (1901); *Across Coveted Lands* (1902); *The Gems of the East* (1904); and *Tibet and Nepal* (1905).

Landon, WALTER SAVAGE (1775-1864), English poet and prose writer, born at Warwick, was educated at Knowle and Rugby, whence a fault of discipline led to his removal. After a period with a tutor at Ashbourne, Derbyshire, he entered Trinity College, Oxford (1793). Landon lived a wandering and unsettled life for some years, mainly at Bath, Bristol, or in

Wales, with a visit to Paris in 1802. The chief literary event of this period of his career was the publication of *Gebir* in 1798. In 1805 he inherited some property from his father, and began to live in style at Bath. In 1808 he joined Blake's expedition to assist the Spanish rising against the French. This ended in the Convention of Cintra, which Landon denounced. In 1809 he bought Llanthony Abbey, Monmouthshire, and in 1811 married Julia Thuyllier, the daughter of a Swiss banker. But he quarrelled with his neighbours, and got into fresh debt over the improvement of his estate, which was finally taken over by his mother, who made him an allowance of £500 a year. Then came a quarrel with his wife, after which Landon moved his establishment to Italy, where he remained for several years. His residence, first at Como, then at Pisa, Pistoja, and Florence, was chequered by disputes with the local authorities; but he struck in his *Imaginary Conversations* upon a fertile literary vein of dialogued essay, which yielded many volumes. In 1832 he visited England, and in 1835, after a fresh quarrel with his wife, left Italy alone. He again settled at Bath, and continued to write both in verse and in prose, paying occasional visits to London, where he had a close ally in 'the most gorgeous Lady Blessington.' About 1837 his brain began to fail him. His quarrels became pitiful, and, after an attack of unconsciousness in 1858, he returned once more to Italy. Here he received attentions from Robert Browning and other men of note, and for a time lived with the sculptor W. W. Story at Siena. In 1859 he returned to Florence, and for some years before his death was much of a recluse. Mr. Swinburne visited him in 1864, and made the occasion memorable in verse. With many faults of temper and of character, Landon was capable of generosity and of distinguished courtesy. His republicanism was that of an aristocratic pagan, and informed the rhythms of a finished and often magnificent prose. Poems: *Miscellaneous Poems* (1795, 1800, 1802, 1831); *Gebir* (1798); *Simonides* (1806); *Count Julian* (1812); *Hellenics* (1847); *Italics* (1848); *Collected Poems*, ed. Crump (1892). Prose Works: *Imaginary Conversations*, vols. i., ii. (1824); vol. iii. (1828); vols. iv., v. (1829); *Citation and Examination of William Shakespeare* (1834); *Pericles and Aspasia* (1836); *The Pentameron* (1837); *The Last Fruit off an Old Tree* (1853); *Imaginary Conversations of Greeks and Romans* (1853); *Dry Sticks Fagoted* (1858); *Collected Works* (1846), ed. Fors-

ter (1876), ed. Ellis (1886-90), ed. Crump (1890-2). See *Life*, by Forster (1869); *Landon*, by Colvin, in *English Men of Letters* (1884); *Letters and Unpublished Writings*, by Wheeler (1897); *Letters, Public and Private*, by Wheeler (1899); *Walter Savage Landon*, by Evans (1892).

Land Rail. See CORNCRAKE.

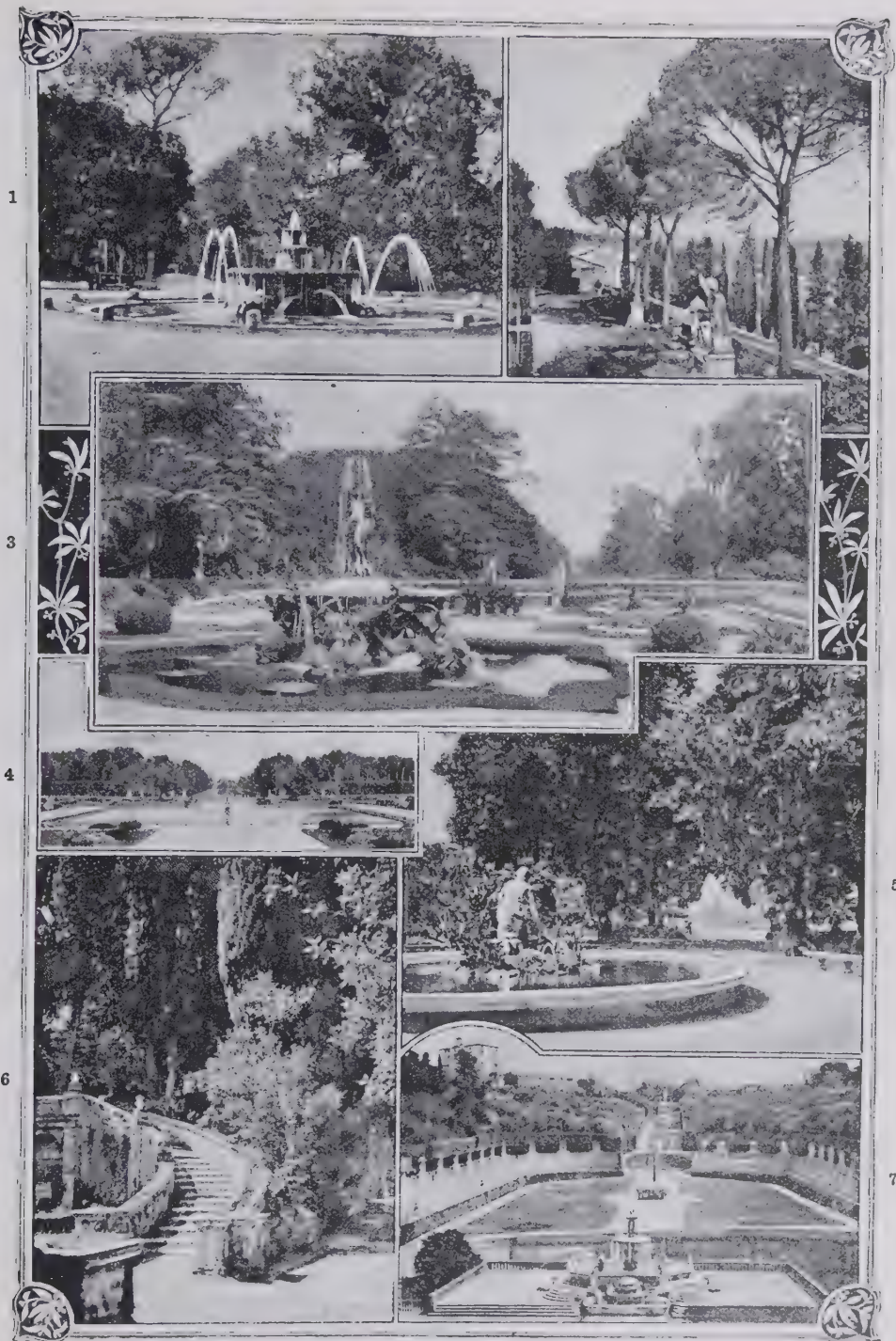
Land Registry. See REGISTRATION OF TITLE.

Landsberg, or L. AN DER WARTHE, tn., prov. Brandenburg, Prussia, on the Warthe, 45 m. N.E. of Frankfort-on-the-Oder. Manufactures of machinery, saw-milling, brick-making, and the making of furniture. Pop. (1900) 33,598.

Landsberg, tn., Bavaria, Germany, on Lech R., 38 m. W. by S. of Munich. Manufactures agricultural machinery. Pop. (1900) 5,977.

Landscape, from the scientific standpoint, is the complex of the phenomena seen from any place. Eliminating atmospheric or marine effects, the various landscapes are controlled by the composition and structure of the rocks (soluble, porous, impervious, homogeneous, layered, horizontal, twisted, vertical), by the agents wearing them away or forming them (running water, sea, ice, wind), and by their covering of plant and animal life. See GEOMORPHOLOGY, GEOGRAPHICAL DISTRIBUTION OF PLANTS.

Landscape-gardening Gardening on an artistic scale was practised by the Assyrians, the Greeks and Romans, and throughout Europe during the middle ages, yet the birth of landscape-gardening proper may be ascribed to Italy in the 15th century; and the most characteristic example now existing is the Boboli garden at Florence, laid out by Cosmo de' Medici. Following this come the splendid gardens of the Quirinal Palace, the Vatican, the Villa Borghese, the Villa Pamphila-Doria, the Villa Ludovici, the Villa Medici, the Villa Albani, and the Villa d'Este, Tivoli, with the more modern public garden on the Pincian Hill. France next showed its interest in landscape-gardening in the gardens laid out by François I. at Fontainebleau, after his return from Italy. This was subsequently altered beyond recognition by Henry IV., Louis XIV., and Napoleon. St. Germain was the next attempt in France, with a landscape garden originally designed for Henry IV., and altered for Louis XIV. and Louis XV. Then followed the Jardin des Tuileries; but all the French gardens were soon eclipsed by those of Versailles, where Louis XIV. commanded Le Nôtre to



Landscape-gardening—some noted examples.

1. Gardens of Villa Borghese, Rome. 2. Villa Medici, Rome. 3. Blenheim. (Photo by Taunt.) 4. Fontainebleau. 5. The Pincio, Rome. 6. Villa d'Este, Tivoli. 7. Boboli Gardens, Florence.

create for him 'a wonder of art such as the world had never seen.' This led to the designer's employment by William and Mary to emulate Versailles on a smaller scale at Hampton Court, St. James's, and Kensington Gardens. About this time the landscape-garden hobby reached England; and William Kent, a landscape painter, who, like Le Nôtre, had been educated in Rome, was employed to plan the parks of Richmond, Esher, Claremont, Stowe,

Lands Clauses Acts. Many Acts of Parliament, both public and private, authorize the taking of land, either compulsorily or by agreement, for the purposes of the undertaking to which they relate. Formerly it was necessary to insert in each special act provisions regulating and facilitating the acquisition of the land required, for the ascertainment and payment of the compensation due to the owners of it, and for other matters connected with

Ireland, and the Lands Clauses Consolidated (Scotland) Act, 1845; but there are amending acts of 1860 (extending to Scotland), 1869, 1883, and 1895. In Ireland the Railway Clauses Acts of 1851, 1860, 1864, and 1868 also amend the Lands Clauses Acts as regards Ireland. See Browne's *Law of Compensation* (2nd ed. 1903).

Landseer, SIR EDWIN HENRY (1802-73), representative member of the English school of animal



A Picture by Landseer—'The Shepherd's Chief Mourner.'

and Rowstham; while his able follower, 'Capability Brown,' remodelled Blenheim, the greatest of all landscape gardens, and designed Longleat and Wilton. Since those days England has shown the lead in the matter of landscape-gardening, and nothing finer has been produced than the gardens of Chatsworth and Trentham. The best practical and historical works on the subject are those of Loudon (1822), Repton (1840), F. R. Elliott (1878), and H. E. Milner (1880).

the purchase. These provisions have been consolidated in the Lands Clauses Acts, which are now incorporated by reference, either wholly or partly, in all special acts which authorize the taking of land. The special acts are thus simplified and shortened, and the procedure is uniform in all cases of the taking of land for public purposes, so that it has become familiar and certain. The principal acts are the Lands Clauses Consolidated Act, 1845, which applies to England and

painting, came of a family of artists, his father being John Landseer the engraver, of whose other sons Thomas (1796-1880) and Charles (1799-1879) were respectively a celebrated engraver and an R.A. Landseer was trained by his father as well as in the Academy schools; he exhibited in the Royal Academy (1815), was elected associate (1826), and became full member (1830). He was the friend of Sydney Smith, Dickens, and other celebrities, and attained high favour at

court. Queen Victoria and the Prince Consort made etchings from his designs, and a knighthood was conferred on him (1850). The famous bronze lions which he designed for Trafalgar Square were erected in 1869. His chief pictures (which have been reproduced by various methods) are in the London, Edinburgh, and Tate galleries, in the South Kensington Museum, and at Windsor and Buckingham palaces. See Wornum's *Epochs of Painting*, Ruskin's *Modern Painters* (1843-60), Stephens's *Sir Edwin H. Landseer* (1880), and Chesneau's *The English School of Painting* (1885).

Land's End (Ptolemy's *Boleum*), most w. point of England, in Cornwall, 9 m. s.w. of Penzance, facing the Atlantic Ocean. It ends in granite cliffs, from 60 to 100 ft. high, fantastically carved by erosion. In the neighbourhood are numerous interesting caverns, and generally the coast scenery is wild and magnificent. On Carn Bras, one of the rocky islets to the N.W., is Longships Lighthouse, erected in 1793.

Landsgemeinden, the legislative assemblies in certain parts of Switzerland, in which every properly qualified male voter appears *in person*, and not by representation. The term is also used of village or valley assemblies of similar nature. This institution still survives in Uri, both divisions of Unterwalden and of Appenzell, and in Glarus, but in 1848 was abolished in Schwyz and Zug. The meetings take place in the open, on the last Sunday of April or the first Sunday of May each year. Historically these assemblies (the earliest known is that of Schwyz in 1294) met to regulate matters relating to the lands owned in common; but later their powers became extended to purely political matters. See Blumer's *Staats- und Rechtsgeschichte der Schweizerischen Demokratien* (1850), Von Wyss's *Abhandlungen zur Geschichte des Schweizer Öffentlichen Rechts*, Freeman's *Growth of the English Constitution* (1872), and Rambert's *Etudes Historiques et Nationales* (1889).

Landshut, tn., Bavaria, Germany, prov. Lower Bavaria, on the Isar, 38 m. N.E. of Munich. Here are the castle of Trausnitz (1232) and the royal castle. Industries: machinery, hats, breweries, and tobacco. Here, in 1809, the Austrians repulsed the Bavarians, but five days later were defeated by Napoleon. Pop. (1900) 21,737.

Landsknechte, erroneously LANZKNECHTE, German mercenary soldiers of the 15th and 16th centuries, were first raised (1487) by the Emperor Maximilian I.

The Landsknechte fought after the Swiss manner, on foot and for the most part in compact masses, and won their greatest fame in the Italian wars of the first half of the 16th century. Their ranks were largely recruited from the minor nobility. As a distinct organization they disappeared in the first years of the Thirty Years'

of Malmö. It has an old castle, a good harbour, iron foundries, shipbuilding yards, and factories for leather, tobacco, woollen wares, and smokeless powder. It exports barley, oats, cattle, eggs, and tilcs. Here, on July 14, 1677, Charles XI. defeated the Danes. On the island of Hven, opposite Landskrona, Tycho



Land's End, the most westerly point of England.

(Photo by F. Frith & Co.)

war. See Wessely's *Die Landsknechte* (1877) and Blau's *Die Deutschen Landsknechte* (1882).

Landskron, tn., Bohemia, Austria, on the Moravian frontier, and on the Sazawa R., 36 m. N.W. of Olmütz. Manufactures linen, woollen, and cotton cloths. Pop. (1900) 6,112.

Landskrona, seapt. tn., co. Malmöhus, Sweden, on the Sound, the junction of many of the Swedish railways, 31 m. N.

Brahé built his observatory of Uraniborg. Pop. (1900) 14,399.

Landslips. On sea-coasts, as the wash of the waves undermines the base of the cliffs, there are often great falls of rock. In the south of England, where cliffs of chalk and greensand rest on the lias clays, the water, sinking freely through the porous overlying strata, is stopped by the impervious clay beneath, and passes gradually down along its upper

surface, appearing on the seashore as a line of springs. After heavy rains, the clay, being saturated, becomes plastic, and as the strata have all a gentle seaward inclination, the weight of the thick pile of greensand and chalk tends to set the mass in motion. The wet clay forms the slippery surface of an inclined plane, and a gradual displacement results, by which the face of the cliff slips forward and downward. This sunken mass is known as the undercliff, and is usually irregularly fractured during the process.

Landslips are characteristic of mountain regions in which the valleys are deep and steep-sided. In the Alps they are very frequent, especially in the more lofty central zone. They are most common in spring when the snow is melting, or in autumn after heavy rains, and are often set in motion by the action of springs saturating or even removing some of the strata, and in this way forming lines of weakness. Some landslips are of great size: that of Flims is estimated by Heim to have contained fifteen cubic kilometres of rock. The landslip of Elm in Glarus (1881), by which two hundred lives were lost, and that of Zug (1887) are two of the best-known recent Alpine landslips. Other great landslips were at Rossberg, near the Rigi (1806), when eight hundred people were killed; at Lyme Regis, Dorset (1839), when a strip of chalk cliff three-fourths of a mile long gave way; at Naini Tal in India (1880), in which thirty Europeans and two hundred natives lost their lives; near Northwich (1880), when the salt works were stopped; at Sandgate (1893); at Bantry (1896); at Darjiling (1899); and at Barbados (1901). See Bonney's *Story of Our Planet* (1893); Geikie's *Text-book of Geology* (4th ed. 1903); Geikie's *Physical Geography* (1884); and Lord Avebury's *Scenery of Switzerland* (2nd ed. 1896).

Landsturm (lit. 'land-storm'), the name of one of the great subdivisions of the German army—a last line of military reserve, only called to arms during actual threat of invasion, and consisting of men who have passed through active, reserve, and Landwehr service, and who remain in the Landsturm till the age of forty-five, after which military obligation ceases. Formerly it was constituted of all men capable of bearing arms between the ages of seventeen and sixty; but now all able-bodied men between the ages of seventeen and forty-five, who are neither in the standing army nor in the reserve, must belong to the Landsturm. The change was made in 1860.

Land Tax. Taxation has been levied on land in various ways at different times and places. It has sometimes, in the case of tithe, taken the form of a definite proportion of the produce, while in the case of Schedule A of the income tax it has varied according to the rent obtained. Some economists, such as the French physiocrats, have held that the entire revenue of a nation should be raised by a tax on land (an *impôt unique*), believing that by this means wealth would be taxed at its source, and the burden of taxation fairly distributed. (See **TAXATION**.) Others, such as modern 'land nationalizers,' would employ the taxation of rent as a mode of securing for the benefit of the community 'the unearned increment.' (See **RENT**.) In mediæval England, under the feudal system, various obligations attached to the tenure of land. A land tax was imposed in 1692 at a definite rate of 4s. in the £. It was intended to apply to personal property as well, but eventually it became a tax on land alone. It continued to be raised at different rates during the following century; but while the rate varied, the valuation according to which the tax was originally charged on different properties remained unaltered. At the close of the 18th century redemption of the tax was allowed on the same basis, and a considerable portion has been redeemed. See references under **TAXATION** and **RENT**; also Higgs's *The Physiocrats* (1897).

Land Values, ENGLISH LEAGUE FOR TAXATION OF, an association founded to advocate the taxation of land values 'as a means to the restoration of the land to the people,' chiefly by means of lecture in the English counties. Originally founded under the designation 'Land Reform League' (1883), the association transformed itself into the 'English Land Restoration League' (1884), and assumed its present title (1902).

Landwehr ('land defence'), a species of German and Austrian militia, or levy of persons otherwise civilian, only called out in time of necessity. The name was first applied in the Tyrol during a rising against the French. A German's military service has four phases—active service, service in the reserves, in the Landwehr, and finally in the Landsturm, all of them compulsory. The Landwehr proved specially effective in the war with Austria in 1866, and in that with France in 1870. In Switzerland all citizens serve for twelve years in the Landwehr after passing twelve years in the regular army. See **LANDSTURM**.

Lane, EDWARD WILLIAM (1801-76), one of the greatest English Arabic scholars, was born at Hereford. In 1825 he made the first of a series of visits to Egypt, and from that time the customs, lore, and literature of the country became his life study. In 1836 he published his well-known *Account of the Manners and Customs of the Modern Egyptians*, a work which, after more than half a century, remains a standard authority on the subject. His translation of the *Thousand and One Nights* (1838-40) was the first accurate version of the celebrated Arabic stories. His greatest work, the *Arabic-English Lexicon* (1863-92; posthumous parts edited by Stanley Lane-Poole), was the result of over twenty years' labour. It was immediately recognized throughout Europe as the first authority on Arabic. See *Life* by Stanley Lane-Poole (1877).

Lane, JONATHAN HOMER (1819-80), American physicist. Born at Genesee, New York, he entered the employment of the United States Coast Survey (1847), became principal examiner in the patent office (1851), and was connected with the bureau of weights and measures (1869-80). He observed the total solar eclipses in Iowa (1869) and in Spain (1870); invented several ingenious instruments, and wrote numerous memoirs on scientific subjects, one of which, on the *Theoretical Temperature of the Sun* (1870), contained the result (known as 'Lane's law') that gases rise in temperature as they contract through cooling.

Lane, SIR RICHARD (1584-1650), lord keeper, born near Northampton, called to the bar, and was appointed deputy-recorder of Northampton (1615). Knighted in 1644, he became lord chief baron in the same year, and in 1645 was made lord keeper. He followed Charles II. into exile to St. Malo, and died in Jersey.

Lane, RICHARD JAMES (1800-72), engraver and lithographer, grandnephew of Gainsborough; became a skilful engraver, and was elected an A.R.A. (1827). Turning to lithography, he was soon at the head of that branch of art in England, and at the same time proved himself a sculptor and draughtsman of merit. His most successful lithographs were after Gainsborough, Lawrence, Leslie, Chalon, and Landseer. His portraits of Queen Victoria, the Prince Consort, and other members of the royal family, are well known.

Lane-Poole, STANLEY (1854), historian and archaeologist, born in London, graduated at Oxford (1878). He early turned his at-

tention to numismatics, and published a *Catalogue of Oriental and Indian Coins* for the British Museum (14 vols. 1875-92), *Social Life in Egypt* (1883), and *Art of the Saracens* (1886). He also edited E. W. Lane's *Arabic-English Lexicon* (1863-92), and *Coins and Medals* (1885). He has travelled much in pursuit of his special subjects, and among his numerous publications may be mentioned his *Life of Lord Stratford de Redcliffe* (1883), *Life of Sir Harry Parkes* (1894), *Moors in Spain* (1887), *Barbary Corsairs* (1890), *The Mohammedan Dynasties* (1893), *Egypt in the Middle Ages* (1901), *Medieval India* (1902), and *Story of Cairo* (1902). Since 1898 he has been professor of Arabic at Trinity College, Dublin.

Lanercost, par., Eskdale div., Cumberland, England, on riv. Irthing, 11 m. N.E. of Carlisle. The parish contains the remains of an Augustinian priory founded in 1169, the nave and north aisle of which are still used as a church, where are to be seen numerous memorials of the Dacre family. The *Chronicle of Lanercost* (1201-1346), a valuable history of the Borders, was actually composed at Carlisle. It was edited by Father Stevenson for the Bannatyne and Maitland Clubs (1839). See Ferguson's *Lanercost* (1870).

Lanfranc (1005-89), first archbishop of Canterbury, born at Pavia; began life as a jurist, teaching at Pavia, Bologna, and Avranches, where he founded the most popular law college in France. In 1042 he entered the monastery of Bec, near Rouen, and in 1045 became its prior. In 1066 he was appointed abbot of the new monastery of Caen, founded by William, Duke of Normandy. After the Norman conquest of England, Lanfranc was induced by William, though reluctantly, to accept the see of Canterbury, which he occupied with great spiritual benefit to the church until his death. He was the author of commentaries on Paul's epistles, a treatise *De Corpore et Sanguine Domini*, letters, and sermons. His complete works were published in Paris by D'Achéry (1648), and an excellent edition, edited by Giles, was issued at Oxford (1844). See *Life* by Crozals (1877).

Lanfranco, GIOVANNI (1581-1647), Italian painter, born at Parma; studied under Annibale Carracci at Rome, where he assisted his master in the decoration of the Farnese Gallery and the church of S. Giacomo. His best work is the magnificent painting on the cupola of San' Andrea della Valle. A large number of his frescoes adorn the churches of Rome and Naples.

Lanfrey, PIERRE (1828-77), French historian and politician, born at Chambéry; wrote *L'Eglise et les Philosophes au XVIII. Siècle* (1855); *Essai sur la Révolution Française* (1858); *Histoire Politique des Papes* (1860), placed on the Index; but his chief work is *Histoire de Napoléon I.* (1867-75), in which he gives an unbiassed picture of Bonaparte. His *Œuvres Complètes* appeared 1879-85, and his *Correspondance* in 1885.

Lang, ANDREW (1844), British man of letters, born at Selkirk, and in 1863 entered Balliol College, Oxford. In 1863, having graduated with a classical first-class, he was elected a fellow of Merton College. He speedily took a position as a translator from the classics, a literary critic, a nimble writer of verse, an anthropologist, historian, and biographer. Mr. Lang collaborated with Professor Butcher on an excellent version of the *Odyssey* (1879); translated Theocritus, Bion, and Moschus (1880), and, with Walter Leaf and Ernest Myers, bks. x.-xvi. of the *Iliad* (1883). His *Aucassin and Nicolette* (1887) and his *Perrault's Popular Tales* illustrate his French accomplishments. He published *The Library* (1881), *Books and Bookmen* (1886), *Lost Leaders and Letters on Literature* (1889), *Old Friends* (1890), *Homer and the Epic* (1893), *Adventures among Books* (1905), and *The Puzzle of Dickens' Last Plot* (1905). Mr. Lang's poetical work includes *Ballads and Lyrics of Old France* (1872), *Ballades in Blue China* (1880), *Helen of Troy* (1882), *Rhymes à la Mode* (1884), *Grass of Parnassus* (1888), and *New Collected Rhymes* (1905). His chief contributions to the study of anthropology and religion are *Custom and Myth* (1884), *Myth, Ritual, and Religion* (1887), *The Making of Religion* (1898), *Magic and Religion* (1901), *The Secret of the Totem and The Clyde Mystery* (1905). Allied to these are *Cock Lane and Common Sense* (1894), *The Book of Dreams and Ghosts* (1897), and *Modern Mythology* (1897). In comparative mythology Mr. Lang has done useful work. Besides writing on Oxford and St. Andrews, he has produced a *History of Scotland from the Roman Occupation* (vols. i.-iii., 1900-1904), *Historical Mysteries* (1904), and *John Knox and the Reformation* (1905). His contributions to biography are *Lord Idlesleigh's Life, Letters, and Diaries* (1890), and the *Life of John Gibson Lockhart* (1896). Elucidations of the Jacobite episode are given in *Pickle the Spy* (1897), *The Highlands of Scotland in 1750*, *The Companions of Pickle* (1898),

and *Prince Charles Edward* (1900). Mr. Lang's *Blue Fairy Book* (1889) began a series of charming fancies in different colours, diversified by *My Own Fairy Book* (1895). His *Angling Sketches* appeared in 1891. He collaborated with Mr. Rider Haggard on *The World's Desire* (1898), and with Mr. A. E. W. Mason on *Parson Kelly* (1899). His *Monk of Fife* (1898) is his only work of fiction unassisted. He edited the English Worthies Series, and editions of Scott, Burns, and Dickens. Mr. Lang has contributed several important articles to this encyclopedia.

Langdale, HENRY BICKERSTETH, BARON (1783-1851), master of the rolls, born at Kirkby Lonsdale, was called to the bar (1811), and practised in Chancery. As master of the rolls (1836) he was distinguished as the 'father of record reform,' and in the House of Lords devoted his energy to legal improvements. See Hardy's *Memories of Lord Langdale* (1852).

Lange, FRIEDRICH ALBERT (1828-75), German philosopher and politician, born at Wald, near Solingen. His chief works are the *Geschichte des Materialismus* (1866), and *Die Arbeiterfrage* (1865), a plea for the labouring classes.

Lange, HELENE (1848), pioneer of the advanced woman movement in Germany, was born at Oldenburg. In 1870 she settled at Berlin as head of a training college. She strenuously objected to the education of women being left in the hands of men, and unsuccessfully petitioned government for the removal of this grievance (1887), and for the furthering of women's higher education; but she nevertheless stirred the authorities to action in the matter.

Lange, JOHANN PETER (1802-84), Biblical exegete, was born at Bier, near Elberfeld; studied at Bonn; was pastor successively at Wald, Langenberg, and Duisburg, and professor of theology at Zürich (1841) and Bonn (1854). The best known among his works, which display an ingenious and exuberant fancy rather than deep insight, are *Das Leben Jesu* (1844-47; Eng. trans. 1864), *Christliche Dogmatik* (1849-52), *Geschichte des apostolischen Zeitalters* (1853-54), and his once-popular *Theologisch-homiletische Bibelwerk*, in 22 vols. (1857), which contains commentaries on all the books of the Bible, and was translated, under the supervision of Professor Philip Schaff, as *Theological and Homiletical Commentary on the Old Testament and the New Testament* (14 vols. and 10 vols. respectively). See Lichtenberger's *Histoire des Idées Religieuses en Allemagne* (1873; Eng. trans. 1889).

Langebek, JACOB (1710-75), Danish historian, early devoted to historical studies, won the favour of the famous scholar Gram by his translations of the Icelandic *Kristnisaga*, and for thirteen years was employed by him as an amanuensis in the royal library. In 1745 he founded a new Danish historical society, and succeeded Gram as record-keeper in 1748. His greatest achievement was the collection of mediæval documents entitled *Scriptores rerum Danicarum*, which he began to edit in 1772, completing the three first volumes before his death.

Langeland (*Lavind*), Danish isl., about 30 m. long and 4½ m. in breadth, lying between the Great Belt, the Baltic, and the Little Belt. Rudkjøbing, on the west coast, is the only town. Pop. (1901) 18,901.

Langenbeck, BERNHARD RUDOLF KONRAD VON (1810-87), German surgeon, born at Padingbüttel, near Hornburg; became professor of surgery at Göttingen (1838), at Kiel (1842), and director of the clinical institute for surgery at Berlin (1847); served as surgeon throughout the wars of 1848, 1864, 1866, and 1870-71. See Bergmann's *Zur Erinnerung an Bernhard von Langenbeck* (1888).

Langenbielau, comm., prov. of Silesia, Prussia, 35 m. s.w. of Breslau, stretches 4½ m. from Reichenbach into the Eulengebirge. Manufactures woollens, cottons, chemicals, sugar, and beer, and has dye works and saw and flour mills. Pop. (1900) 19,122.

Langendijk, PIETER (1683-1756), Dutch dramatist and poet, born at Haarlem; was the author of *Don Quichot op de Bruijloft van Kamacho* (1712), and of some descriptive poems, the chief merit of which lies in the songs with which they are interspersed. His complete works were published at Haarlem (1721-60). See Meijer's *Pieter Langendijk* (1891).

Langendreer, comm., prov. of Westphalia, Prussia, 7 m. w. by s. of Dortmund; has coal mines. Pop. (1900) 19,928.

Langensalza, tn. and wat.-pl., prov. of Saxony, Prussia, 13 m. N.W. of Gotha, with sulphur springs. Here, on June 27, 1866, the Prussians defeated the Hanoverians. Pop. (1900) 11,926.

Langham, NATHANIEL (1820-71), pugilist, born at Hinckley, Leicestershire; was one of the best middle-weight pugilists in the history of the prize-ring. He will be remembered as the only man who ever beat Tom Sayers (1853).

Langholm, par., mrkt. tn., and burgh of barony (1643), Dumfriesshire, Scotland, on riv. Esk, 21

m. N.W. of Carlisle. Manufactures tweeds, and has tanneries and a distillery. In the vicinity is Gilnockie Tower, the stronghold of the famous moss-trooper Johnnie Armstrong. Telford the engineer was a native of the parish. Pop. (1901) 3,142.

Langhorne, JOHN (1735-79), poet, born at Kirkby Stephen; entered holy orders; removed to London (1764); wrote for the *Monthly Review*, and did much other miscellaneous literary work. He published *Poetical Works* (1766); *Plutarch's Lives*, in conjunction with his brother (1770), which is still the standard translation. See *Memoirs*, by J. T. Langhorne, prefixed to edition of *Poetical Works* (1804).

Langiewicz, MARYAN (1827-87), Polish patriot, born at Krotoszyn; served in the Prussian artillery, fought under Garibaldi (1860), and, joining the Polish insurgents (1863), was elected dictator. His skilful guerrilla tactics resulted in several Russian defeats; but while attempting to rouse Polish Galicia, he was arrested by the Austrians, and was confined until 1865. He afterwards entered the Turkish service.

Langland, WILLIAM (?1330-1400), the probable author of *The Vision of Piers Plowman*, is one of the great figures in English literature, and one of those of whom least is known. Born in the neighbourhood of Malvern, he was educated and assisted in his youth by patrons, whose death left him lonely and poor, and forced him to support himself and an uncongenial wife by discharging the thankless and ill-paid duties of a clerk and singer of masses for the dead in London churches. While dwelling in Cornhill, his heart turned towards 'Malverne hilles,' and it was there that he saw, all 'in a somer soun, when soft was the sonne,' the great vision of a 'faire felde ful of folke,' and learned the doom earned by all the insincere and purposeless, and the great glory of truth and of work.

This is the burden of the *Vision*, shown forth in changing scenes, in which move personified the great influences of that and of all time, as Holicherche, the Knight Conscience, Lady Mede (Mammon), the deceiver Fals, and the great central figure, Piers Plowman, at first the toiler at his furrow, but finally identified with the Christ Himself.

The poem is in two parts—(1) *The Vision of Piers Plowman*, and (2) *Vita de Do-wel, Do-bet, and Do-best*. The first sets forth the evil deeds of monks, hermits, merchants, kings, and other types of mankind, and closes with the search of the Seven Deadly Sins,

undertaken, at the instigation of Reason for Truth, in which Piers Plowman appears as their guide. *Do-wel* is concerned chiefly with the misdeeds of the religious orders; *Do-bet* with the death and subsequent triumph of Christ; *Do-best* with succeeding reign of Antichrist, though at the close is sounded a note of hope in the vow of Conscience to search the world until he finds Piers Plowman.

The three versions of the whole poem, all the work of Langland, were produced between 1362 and a date after 1390. An edition of the texts has been prepared by Professor Skeat for the Early English Text Society; he has also edited for the Clarendon Press an edition of the *Vision* (1886; 6th ed. 1891). See Jusserand, *L'épopée mystique de William Langland* (1893).

Langley, SAMUEL PIERPONT (1834), American astronomer, was born at Roxbury, Boston, Massachusetts. He was elected to the chair of astronomy in Pennsylvania University, with the directorate of the Allegheny Observatory (1867), and became secretary to the Smithsonian Institution (1887). He observed the total solar eclipses of 1869, 1870, and 1878; invented the bolometer, and employed it to explore (1881) the infra-red solar spectrum, of which he published a map including 740 absorption lines (1901). His aeronautical experiments were intended to demonstrate the feasibility of mechanical flight (1896).

Langreo, tn., prov. Oviedo, Spain, 10 m. s.e. of Oviedo; has important coal and iron mines and several iron foundries. Pop. (1900) 18,751.

Langres (anc. *Andematunum*), tn, dep. Haute-Marne, France, near riv. Marne, 20 m. s. of Chaumont; of considerable military importance, and strongly fortified. It has a fine 12th-century cathedral. Manufactures cutlery. The seat of a bishopric. Pop. (1901) 9,921.

Langside, suburb of Glasgow, in par. of Cathcart, Renfrewshire, Scotland; was the scene of the defeat of Mary Queen of Scots by Regent Murray (1568).

Lang-son, cap. of the first military territory of Tong-king, French Indo-China, 74 m. N.E. of Hanoi, 12 m. from Chinese frontier; connected by railway with Phu-lang-thuong (62 m.), and with Na-Cham and Lung-Chau; an important commercial emporium between S. China and Tong-king. During the Franco-Chinese war (1884-5) Lang-son was a centre of operations.

Langtoft, PETER OF (d. 1307), rhyming chronicler, rendered Bosham's *Life of Becket* from

Latin into French verse, and composed a versified chronicle of English history, afterwards translated by Robert de Brunne, published at Oxford (1725). The complete *Chronicle* was published by Thomas Thorpe in the Rolls Series (1866-8).

Langton, STEPHEN (d. 1228), English prelate, was educated in France, becoming chancellor of Paris University; made cardinal by Innocent III., who, at Viterbo, consecrated him archbishop of Canterbury. King John resisting the papal appointment, interdict and excommunication were declared, and the king submitted. A warm partisan of the barons in their conflict with John, Langton's was the first signature appended to Magna Charta. The division of the Bible into chapters is attributed to him. See Hook's *Archbishops of Canterbury*.

Langtry, LILLIE, MRS. (1852), actress, daughter of the Rev. W. C. le Breton, dean of Jersey, married Mr. Langtry (1874). In 1881 she made her debut at the Haymarket Theatre as Blanche Haye in *Ours*, and later represented Kate Hardcastle in *She Stoops to Conquer*. In 1882 she appeared again at the same theatre, and also played Rosalind in *As You Like It* at the Imperial Theatre. She has twice been lessee of the Prince's Theatre (now Prince of Wales's), and has toured successfully with *Peril* and other plays in America. In 1891 she leased the Princess's Theatre. Among her other characters are Juliana in *The Honeymoon*, Cleopatra, Lady Macbeth, Julia in *The Hunchback*, and Galatea. After the death of Mr. Langtry she married Mr. Gerald de Bathe (1899).

Language. See GRAMMAR, PHILOLOGY, GENDER.

Languedoc, old s. prov. of France, between the Garonne and the Rhone, cap. Toulouse. It now forms departments of Tarn, Lozère, Ardèche, Gard, Hérault, and Aude, and parts of Ariège, Haute-Garonne, Tam-et-Garonne, and Haute-Loire. Its name is derived from the Old Fr. *langue* and the Provençal *oc* (from Lat. *hoc*, 'this'—the Provençal equivalent of the Old Fr. *oui*, *oil* (from Lat. *hoc illud*); hence the Old French language was known as the *langue d'oui*, *langue d'oïl*). See Devic and Vaissette's *Histoire de Languedoc* (1873).

Langur, the name given to the monkeys belonging to the genus *Semnopithecus*, which are Asiatic forms characterized by the slender build, the very long tail, the absence of cheek pouches, and the fact that the hind limbs are longer than the fore. The

stomach is peculiar, for it is furnished with sacs or pouches; and the animals are largely herbivorous in diet, living chiefly upon leaves and young shoots. The true langur or hanuman (*S. entellus*) is common throughout the greater part of India, and is in most places regarded as sacred by the Hindus.



Langur.

Janidæ. See SHRIKE.

Lanier, SIDNEY (1842-81), American author and poet, was a native of Macon, Georgia. During the civil war, when he served with the Confederates, he contracted consumption. He published an account of his experiences during the war in *Tiger Lilies* (1867). In 1876 he wrote a guidebook to Florida, whither he had gone in search of health. This was followed by several tales for boys (1878-82), and a volume of verse (1877). Two years later he became lecturer on English literature in the Johns Hopkins University. His most important prose works were his *Science of English Verse* (1880), a discussion on the relations of music and poetry, and *The English Novel* (1883). His *Letters 1866-81* were published by his wife (1899).

Lankavatāra, an important work on Buddhist law and philosophy, dealing with many abstruse speculations. See works on Buddhism by Eugène Burnouf, Monier-Williams, Rhys-Davids, and others.

Lankester, EDWIN RAY (1847), physiologist and naturalist, was born in London. He has been successively professor of zoology and comparative anatomy at University College, London (1874-90); Linacre professor of comparative anatomy, Oxford (1891-8); and Fullerton professor of physi-

ology and comparative anatomy in the Royal Institution, London (1898-1900). Since 1898 Professor Lankester has been director of the natural history departments of the British Museum. Among his numerous publications are *A Monograph of the Cephalaspian Fishes* (1870), *Comparative Longevity* (1871), *Degeneration* (1880), *Spolia Maris* (1889), and *Extinct Animals* (1905). He is also editing *A Treatise on Zoology* (pts. ii., iii., iv., 1900-2).

Lanner (*Falco Feedeggii*), a small falcon found in the countries bordering the Mediterranean.

Lannes, JEAN, DUC DE MONTEBELLO (1769-1809), French marshal, born at Lectoure; entered the army (1792), and served with great distinction under Napoleon I., winning special glory at Aboukir, Acre, Montebello, and Marengo. He also did brilliant service at Austerlitz, Jena, Eylau, and Friedland, and in Spain at Tudela and Saragossa, and was mortally wounded at Aspern. See Thoumas's *Le Maréchal Lannes* (1891).

Lannion, riv. port, dep. Côtes-du-Nord, France, on riv. Guer, 54 m. N.E. of Brest; industry mainly fishing. Pop. 6,126.

Linoline, or wool fat, chiefly consists of cholesterol and isocholesterol, isomeric compounds of an alcoholic constitution, and having the formula $C_{26}H_{45}OH$. Linoline is prepared from 'suint,' or the grease of sheep's wool, by separating the fatty acids with which it is mixed by saponification, and then purifying the residue—a pale yellow, waxy, somewhat sticky solid. It does not become rancid, and is capable of taking up a considerable proportion of water. As it is very easily absorbed by the skin, and has some antiseptic properties, it is extensively used as a salve and basis of ointments.

Lansdell, HENRY (1841), English author, traveller, and divine; has travelled in every European country, through a great part of Asia and Africa, and across America (1870-98), for the purpose of visiting hospitals and prisons, or making explorations on missionary work. In Russian and Chinese Turkestan he made extensive zoological collections. He was the founder and editor (1875-86) of the *Clergyman's Magazine*, and his publications include *Through Siberia* (1882), *Russian Central Asia* (1885), and *Chinese Central Asia* (1893).

Lansdown, hill (813ft.), Somerset, England, 2½ m. N.W. of Bath. On it is Lansdown Tower, 130 ft., erected by Beckford, the author of *Vathek*. Two miles distant is the site of the battle of Lansdown (1643).

Lansdowne, HENRY CHARLES KEITH PETTY-FITZMAURICE, FIFTH MARQUIS OF (1845), English statesman, received his first official appointment (1869) as Lord of the Treasury in the government of which Mr. Gladstone was prime minister; became under-Secretary of State for War in succession to the Earl of Northbrook (1872). On Mr. Gladstone's return to power in April 1880, the Marquis of Lansdowne went to the India Office as under-secretary, but on July 8 retired, owing to disagreement with the policy of the Compensation for Disturbance (Ireland) Bill. On Mr. Gladstone's recommendation he was appointed governor-general of Canada (1883), and five years later he became viceroy of India on the nomination of the Marquis of Salisbury (1888). Lord Lansdowne had, in the meantime, separated himself from the Gladstonian party on the ques-



Lord Lansdowne.

(Photo by E. H. Mills.)

tion of Home Rule. He returned from India in 1893, and two years later joined the third Salisbury ministry with other Liberal Unionists. He accepted office as Secretary of State for War, and held this position till November 1900, when he became Secretary of State for Foreign Affairs. Mr. Balfour confirmed him in this appointment on the formation of his first ministry in July 1902, and he retained it till Mr. Balfour's resignation in December 1905.

Lansdowne, HENRY PETTY-FITZMAURICE, THIRD MARQUIS OF (1780-1863), English statesman; entered Parliament for Calne (1803), and was Chancellor of Exchequer under Lord Grenville; succeeded Pitt as M.P. for Cambridge University (1805), and became Marquis of Lansdowne in 1809. He zealously supported the abolition of slavery and repeal of Catholic disabilities; also proposed free trade measures

(1820), and measures for the relief of Ireland (1822). He held office under the Canning, Goderich, and Grey ministries (1830-41), lending valuable assistance in the passing of the Reform Bill (1832); was opposition leader during the Peel administration (1841-46), and led the peers under Lord John Russell (1846-52). He was twice offered the premiership (1852, 1855), but declined. He was an earnest though prudent Liberal and supporter of reform. See Walpole's *Life of Lord John Russell* (1889).

Lansdowne, WILLIAM PETTY, FIRST MARQUIS OF (1737-1805), English statesman, born in Dublin; distinguished himself as a soldier; appointed a king's aide-de-camp (1760); and became Earl of Shelburne (1761). As politician he attached himself to the Chatham party, becoming Home Secretary (1782), and First Lord of the Treasury (1783), when, on his defeat by a coalition, he resigned the leadership of his party to Pitt. He was created Marquis of Lansdowne (1784). See *Life* by Fitzmaurice (1875).

Lansing, city, Ingham co., Michigan, U.S.A., cap. of state, 70 m. S.E. of Grand Rapids, and is on Lake Shore and Michigan Southern, Michigan Central, and Pere Marquette railways. Manufactures of agricultural implements, flour stores, machinery, carriages, and condensed milk. Pop. (1900) 16,485.

Lansingburg, tn. of Rensselaer co., New York, U.S.A., on E. bank of the Hudson, 5 m. N. of Troy. Pop. (1900) 12,595.

Lantana, a genus of tropical and subtropical evergreen shrubs and herbs belonging to the order Verbenaceae. They bear small flowers in spikes or cymes. The corolla tube is slender, and the petal limbs five in number. Most of the garden varieties are derived from *L. camara*, a Jamaica shrub about eight feet in height, with a prickly stem, thick leaves, hairy below, and reddish or orange flowers. Lantanas are much used for bedding-out and as greenhouse plants; their flowering season extends over several months.

Lantern, a conspicuous structure, usually circular, crowning the dome or tower in Roman and Gothic buildings. Its position is over the intersection made by the crossing of the nave and transepts in a church or cathedral. St. Paul's, London, and Ely Cathedral are good examples. The glazed ceiling, for light and ventilation in private dwellings, is also known as the lantern. See Ruskin's *Seven Lamps of Architecture*.

Lantern, OPTICAL. See OPTICAL PROJECTION.

Lantern-fly, a name given to certain hemipterous insects belonging to the family Fulgoridae. The Chinese lantern-fly (*Fulgora candelaria*) is widely distributed in Asia.

Lanthanum, La, 138.9, a metallic element of the 'rare earths,' occurring in such minerals as cerite, orthite, monazite, gadolinite, and others. It is prepared by displacement from its chloride by sodium, and resembles iron; sp. gr. 6.2, m.p. 750° C. It burns brilliantly when heated in air, and forms an oxide, La₂O₃, and colourless salts.

Latuvium, anc. city, Latium, Italy, 20 m. S.E. of Rome, near the Appian Way. A celebrated temple of Juno Sospita was built here. It was the birthplace of Antoninus Pius (86 A.D.). The small town of Civita Lavinia occupies part of the site.

Lanza, GIOVANNI (1815-82), Italian politician, born at Vignale, Piedmont; was elected deputy for Frassineto (1848). Sitting with the Left Centre or Moderate Liberals, Lanza became minister of education under Cavour (1855-8), minister of finance (1858-9), president of the chamber (1860), minister of the interior under La Marmora (1864), and prime minister of the reconstructed cabinet (1869), but was defeated by the coalition (1873). He was a sincere patriot and a capable financier. See Tavallini's *Lanza ed i suoi Tempi* (1887).

Lanzarote, most easterly of the Canary Is., is of volcanic origin and very mountainous: highest summit, Pamará (2,050 ft.). It produces excellent grapes, and has other agricultural products. Cap. Arrecife, on the S.E. coast. Area, 325 sq. m. Pop. (1900) 16,500.

Lanzi, LUIGI (1732-1810), Italian antiquary, born near Macerata; became a Jesuit, but on the suppression of the order devoted himself to art and archaeology. His chief works are his *Storia Pittorica della Italia* (1789-1806; Eng. trans. 1828); *Saggio di Lingua Etrusca* (1789); *De Vasi Antichi Dipinti* (1806), and other kindred books. He was also a graceful poet. See his *Opere postume* (1817), and Cappi's *Biografia di Luigi Lanzi* (1840).

Laoag ('clear'), cap., prov. Ilocos Norte, Luzon, Philippines, on riv. Laoag, 5½ m. from the sea. Rice, corn, tobacco, and sugar are exported, and cotton is grown and manufactured. Pop. (1898) 37,094.

Laocoön, in ancient Greek legend, a Trojan priest of Apollo, who tried to dissuade his countrymen from bringing into the city the wooden horse by which Troy was captured. He even smote

his spear into its side. It was perhaps in punishment for this that, when he was sacrificing to Poseidon, two snakes came out of the sea, and first entwining themselves about his two sons, and then about him as he hastened to their aid, killed all three, as is represented in the famous group found at Rome in 1506, and now in the Vatican. The date of its construction is uncertain, but the

Laodamia, daughter of Acastus, and wife of Protesilaus. After her husband's death at Troy, the gods granted her request that he might return from Hades to converse with her for three hours; when he departed from life a second time, she died with him.

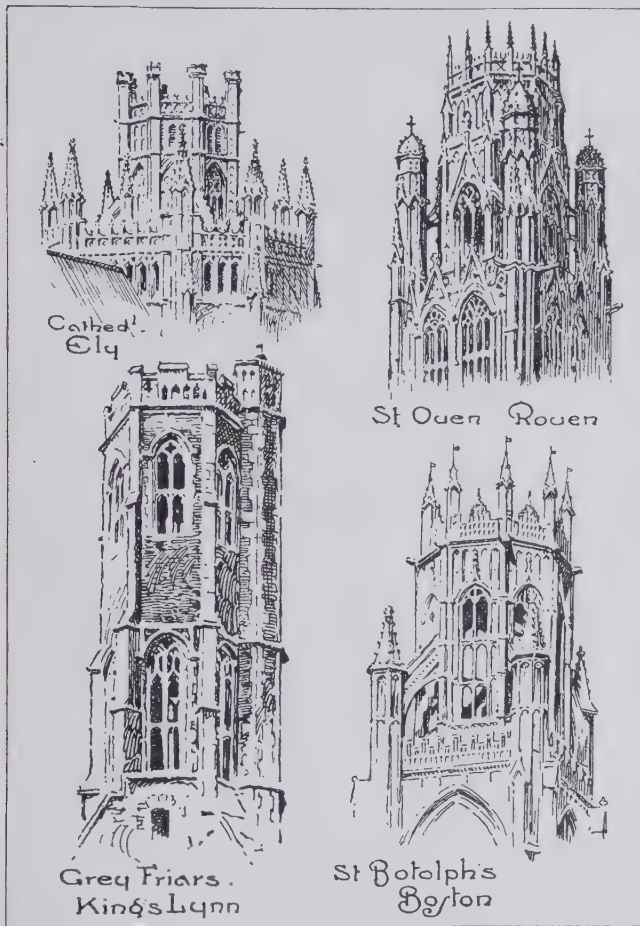
Laodicea, the name of several cities in Asia Minor and Syria. The most important are: (1.) L. AD

cities in Asia (Rev. 3:17), and was renowned for its woollen manufactures, its carpets, and its woven garments (3:18). In the reign of Nero it was destroyed by an earthquake, and rebuilt by its wealthy inhabitants. According to tradition, Philemon was the first bishop. From Col. 4:16 it would appear that St. Paul wrote an epistle to the Laodiceans, and some authorities suppose this letter to have been the Epistle to the Ephesians or that to Philemon. (2.) L. AD MARE, about 50 m. s. of Antioch in Syria. It was founded by Seleucus I. about 300 B.C., and its modern name is Ladikiyi, or commonly Latakia. (3.) L. COMBUSTA, in Lycæonia, on the high-road from Ephesus to the East. Sorgan Ladik is on the site. See Wilson's *Handbook for Travellers in Asia Minor* (1895); Ramsay's *Cities and Bishoprics of Phrygia* (1895-7), and *Historical Geography of Asia Minor* (1890).

Laomedon, in ancient Greek legend, a son of Ilus and Eurydice, and father of Priam, Tithonus, and Hesione, was king of Troy, of which he was the founder.

Laon (Rom. *Laodunum*), cap. and first-class fortress, dep. Aisne, France, 22 m. S.E. of St. Quentin. It contains a fine 12th-century Gothic cathedral. Manufactures linen and metal goods. In the 10th century it was the residence of the Carolingian kings. From 1419 to 1429 it was in the hands of the English. Here, in 1814, Napoleon was defeated by Blücher. The town capitulated to the Germans in 1870. Pop. (1901) 15,434.

Laos, general name for Central Indo-China, including the basin of the Mekong and the upper basins of the Menam and Salwin; bordering Siam and Burma on the W., Yün-nan on the N., Tong-king and Annam on the E., and Cambodia on the S. Laos is distributed into three parts:—(1.) Eastern or French Laos, which has been under French protectorate since 1893; estimated area, 100,000 sq. m.; pop. 600,000. (2.) Siamese Laos, made up of a number of semi-independent principalities; estimated pop. 3,000,000. (3.) The Shan states of Lakon, Chiang-mai, Nan, etc. The chief industry is cattle-raising; but the land produces rice, cotton, indigo, fruits, tobacco, and teak. Gold, tin, lead, and precious stones are found. The only entrance to French Laos is by the Mekong. At Khong, where the river is barred, a railway four miles long has been laid. The Siamese conquered the country at the beginning of the 19th century. See L. de Reinach's *De Laos* (1901), and Captain Gosselin's *Le Laos et le Protectorat Français* (1900).



Examples of Lantern Towers.

work is ascribed to three Rhodian sculptors, Agesander, Polydorus, and Athenodorus. Virgil's description of the death of Laocoön in the second book of the *Aeneid* is undoubtedly inspired by the marble group. For the story, see Virgil and Hyginus; for the Laocoön group, Murray's *History of Greek Sculpture*, Furtwangler's *Masterpieces of Greek Sculpture*, and Lessing's *Laokoön*.

LYCUM, on the riv. Lycus, a tributary of the Mæander, in ancient Phrygia (S.W. Asia Minor), about 11 m. W. of Colossæ. It was founded by Antiochus II. about 259 B.C. One of the 'seven churches' (Rev. 1:11), it is mentioned in close connection with Colossæ and Hierapolis (Col. 4:13, 15, 16). The great 'eastern highway' passed through it, and it was one of the richest



Laocöon and his two Sons killed by Serpents.

Statue ascribed to Agesander, Polydorus, and Athenodorus of Rhodes, in the Vatican Museum, Rome.

Lao-tse (b. 604 B.C.), a celebrated Chinese philosopher, and said to be the founder of Taoism, one of the most ancient and important religions of China, was born at Keuh-jin, in the district of Koo. Lao held office at the imperial court of Chow as keeper of the archives. He is celebrated as the reputed author of the book *Tao-teh-king*, the principal object of which is to establish a knowledge of a supreme being in three persons. In his book Lao has elaborated his idea of the relations existing between the universe and that which he calls *Tao*. The primary meaning of this name of a thing which he declares to be without name is 'the way.' Hence it has acquired the symbolical meanings of 'the right course of conduct,' 'reason,' and it also signifies 'the word' (*logos*). 'All things originate from Tao, conform to Tao, and to Tao they at last return.' Tao may be described as (1) the absolute, the totality of being and things; (2) the phenomenal world and its order; and (3) the ethical nature of the good man and the principle of his action. See Douglas's *Confucianism and Taoism* (1879); Legge's *Religions of China* (1880); Balfour's *Taoist Texts* (1884).

Lapageria, a genus of liliaceous plants containing only one species—*L. rosea*, the Chilean bell-flower. This is an evergreen climbing shrub, almost hardy in this country, though it is generally grown under glass. It bears large, rose-coloured, bell-shaped flowers of a somewhat waxy appearance. The flowering period is a long one, extending over several months. The variety *L. r. alba* produces flowers of pure white.

La Palma, tn., prov. Cundinamarca, not far from the Rio Negro, Colombia, S. America; has large coffee plantations and mines of gold and copper. Alt. 4,130 ft. Pop. 10,000.

Laparotomy (Gr. *laparē*, 'the flank'; *tomē*, 'an incision'), or abdominal section, is an operation involving the opening of the peritoneal cavity by means of an incision through the anterior abdominal wall. Laparotomy is always a measure of extreme gravity, and the operation must be conducted under the most rigorous aseptic precautions. Great care must be taken to remove all fluids, such as pus, blood, or lotion, and foreign bodies, such as sponges or shreds of tissue, from the abdominal cavity before the wound is closed. Drainage from the wound is seldom required, except under special circumstances. In midwifery such an abdominal section is known as the Cæsarean operation.

La Paz. (1.) Department, N.W. Bolivia, S. America, bounded on the N. by the Rio Madre de Dios, on the E. by Cochabamba and Beni, on the S. by Oruro, and on the W. by Peru. The northern part is an extensive plateau, and well watered by the affluents of the Beni and Purus, but it is unhealthy. The southern part is mountainous, and contains the section of the Andes known as the Cordillera Real. In this department are several of the highest peaks of the continent, notably Illimani (22,500 ft.) and Illampu or Sorata (23,500 ft.). Part of Lake Titicaca, which is drained by the Desaguadero, is included in the southern part. Amid the mountains are many fertile valleys with a good climate; these produce corn, potatoes, coffee, sugar, rice, and cocoa. Gold, silver, copper, and tin are mined. Area, 53,770 sq. m. Pop. (1900) 445,616, five-sixths being Indians. (2.) Largest town in Bolivia, centre of above department, on the river Chuquapu, or Rio de la Paz, 30 m. S.E. of Lake Titicaca. A road forty-seven miles long leads to the port of Chililaya (Puerto Perez), on Lake Titicaca. A railway fifty-three miles long to Guaquí on the lake has been recently opened. The city was founded in 1548, after the struggle between the Almagros and Pizarros, and named Nuestra Señora de la Paz; but at the declaration of independence the name was changed to La Paz de Ayacucho, in memory of the decisive victory over the Spaniards. Trade in agricultural and mining products. Alt. 11,900 ft. Pop. (1900) 60,031. (3.) Town, prov. Entre Rios, Argentina, S. America, on the river Paraná, 80 m. above Paraná city. Port of call for steamers; exports hides and preserved beef. Alt. 130 ft. Pop. 9,000. (4.) Town, Mendoza, Argentina, S. America, W. of the Desaguadero, 565 m. by rail from Buenos Ayres. Alt. 1,630 ft. Pop. 4,000.

La Pérouse, JEAN FRANÇOIS DE GALAUP, COMTE DE (1741-88), French navigator, born near Albi, and entered the French navy. In 1782 he was employed by the French government to make a voyage of discovery round the world in the *Boussole* and the *Astrolabe*. After doubling Cape Horn, and exploring the coasts of California and Macao, and making important discoveries from China to Kamchatka, he reached Botany Bay. Finding the British already in possession, he left. The fate of his expedition was unknown until remains of it were found in 1827 by Captain Dillon on the isle of Vahikoro in Oceania. See Dillon's *Narrative of a Voyage in the South Seas* (1829), and Mureau's *Voyage au Tour du Monde* (1797).

Lapeyrouisia, a genus of African bulbous plants belonging to the order Iridaceæ, with blue or red flowers, usually in long, irregular spikes. The flowers have slender perianth tubes and deeply cleft stigmas, and are scentless. The chief species are *L. cruenta*, carmine; *L. corymbosa*, blue and white; and *L. juncea*, rose. They should be grown under glass.

Lapis Lazuli. See GEMS AND PRECIOUS STONES.

Lapithæ, in ancient Greek legend a people which dwelt in the mountains of Thessaly. Their king was Peirithous, who, as a son of Ixion, was a half-brother of the Centaurs, with whom he had a combat, in which the Centaurs were vanquished. The story is referred to by Homer in his *Odyssey*, also by Diodorus, Pausanias, Ovid, and other ancient writers. See Keightley's *Mythology of Ancient Greece and Italy* (1832), and Preller's *Mythologie* (1854).

Laplace, PIERRE SIMON, MARQUIS DE (1749-1829), the greatest of French mathematicians, author of the *Mécanique Céleste*, was a native of Beaumont-en-Auge. In 1867 he removed to Paris, where he gained the notice of D'Alembert, and through his influence was appointed professor of mathematics at the Ecole Militaire. Before completing his twenty-fourth year he had signalized himself by his discovery of the invariability of the mean distances of the planets from the sun. About the same time he was admitted to the Académie des Sciences, and thenceforward devoted himself to the investigation of the laws regulating the solar system. His researches embraced the whole theory of gravitation; and he had the high honour of perfecting the work of his predecessors. In 1796 he published his *Exposition du Système du Monde*, a compendium of astronomy in which he sets forth his famous Nebular Hypothesis, a work considered one of the masterpieces of the French language. In 1799 the publication of *Traité de Mécanique Céleste* brought him world-wide fame. His other works include *Théorie du Mouvement et de la Figure des Planètes* (1784); *Théorie Analytique des Probabilités* (1812-20), and many treatises in the transactions of learned societies. His *Œuvres Complètes* were published by the Académie des Sciences (13 vols. 1878-98). See Fourier's *Eloge* (1829); Arago's *Rapport* (1842); and Todhunter's *Elementary Treatise on Laplace's Functions* (1875).

Lapland. This territory, having no political existence at the present day, may be roughly described as the Arctic region of

Norway, Sweden, and Finland, consisting mainly of mountain, forest, and morass. Högström relates that the Lapps of his day (c. 1746) asserted that the whole of Sweden once belonged to their ancestors; and Von Düben gives a tradition of the Mountain Lapps which assigns to their remote ancestors a home lying far to the S.E., apparently in the West Altai highlands. Thence, they allege, they were driven by their enemies, and wandered W. and N. in two divisions; the former of which eventually reached the sound separating Denmark from Sweden. This they ferried across in their small skin-boats. The tradition is interesting, if for no other reason than that modern science has de-

The average stature of the Mountain Lapps is from five feet to five feet two inches, and they are generally taller than the coast tribes. Other characteristic features are their small, elongated eyes, high cheek-bones, snub noses, wide mouths, and pointed chins, with little or no beard, and thin, short legs. Their arrow-heads were sometimes made of iron, sometimes of bone. Spears they only used for bear-hunting.

Although they have abandoned their religion and many of their old customs, they mostly live a nomadic life as hunters and fishers, having large herds of domesticated reindeer. Modern civilization, however, is affecting them in many ways.

La Porte, cap. of La Porte co., Indiana, U.S.A., 12 m. S.E. of Michigan city; popular summer resort. Manufactures woollen goods and agricultural implements, etc. Pop. (1900) 7,113.

Lapp Drum. The runic or magic drum formerly played an all-important part in the religious rites of the Lapps. By means of it the priest could place himself *en rapport* with the spirit world, and thereby foretell future events, see (by clairvoyance) the actions of persons in other countries, forecast the measure of success attending the day's hunting or other business, heal the sick, or, conversely, afflict people with disease, and, if necessary, cause death. For this malevolent application



duced a race of 'reindeer-men' as the primitive inhabitants of Western Europe.

The Lapps are so named by the Swedes, and by most Europeans, but the Norwegians call them Finns; and it is necessary to bear in mind that the Finns of the Norse sagas were Lapps, and not the people of Finland proper. The Lapps call themselves *Sabme* or *Same* (pl. *Sameh* or *Samelets*); and their country is *Same-ádnám*. As Von Düben points out, these names at once suggest *Suomi* (Finland proper) and *Suomalaiset* (Finlanders), and also the race of the *Samoyedes*—all these three peoples being linguistically related.

The best work on the subject is Baron von Düben's *Om Lappland och Lapparne* (1873), to which is appended a list of 332 bibliographical references. See also Sir Arthur de Capell Brooke's *Winter in Lapland and Sweden* (1827), and Paul Du Chaillu's *Land of the Midnight Sun* (1888).

La Plata. (1.) Capital of Buenos Ayres prov., Argentina, 35 m. S.E. of Buenos Ayres, and 3 m. from Ensenada, its port on the river Plate estuary. It is the seat of the provincial government; has a university, observatory, and museum; exports cattle and agricultural products. Pop. (1901) 75,023. (2.) RIO DE LA PLATA. See PLATA.

of its power the magic drum began to fall under the ban of the law as early as 1671, when, as Scheffer tells us, several Lapps were apprehended and their drums burnt. Gourdon, in 1614, describes the Samoyedes as using a hare's foot to strike the sacred drum, which he speaks of as 'a great tabor made with a wolf's skin.' See Erich Johan Jessen's *Afhandling om de Norske Finners og Lappers Hedenske Religion* (1765); Scheffer's *Hist. of Lapland* (1674); the Hon. John Abercromby's *Pre-and Proto-historic Finns* (1898); Baron von Düben's *Om Lappland och Lapparne* (1873); and J. M. Dixon in the *Trans. Asiatic Soc., Japan*, vol. xi., part 1 (1883).

Lappenberg, JOHANN MARTIN (1794-1865), German historian, born at Hamburg. He became minister to the court of Berlin (1820), and in 1823 keeper of the archives of the senate of Hamburg, also representing that city in the Diet of Frankfurt. He was the author of valuable historical works, notably *Geschichte von England* (1834-7), continued by Pauli (1853-81), and Eng. trans. by Thorpe. He also wrote a continuation of Sartorius's *Urkundliche Geschichte der Deutschen Hanse* (1830). See Meyer's *Johann Martin Lappenberg* (1867).

Lappmark ('Lapp Marches'), the five marches of Swedish Lapland, consisting of Asele, Umeå, Piteå, Luleå, and Torned, with an area of 44,667 sq. m. In the mountainous parts, which include the highest Swedish peak, Kebnekaise, 7,180 ft., are the sources of the numerous rivers of N. Sweden which flow into the Gulf of Bothnia, also many lakes. The longest day lasts three months in the northernmost parts. Wolves, bears, lynxes, martens, ermines, and hares are common. Pop. (entirely Lapp) 6,800.

Lapps. See LAPLAND.

LaPrade, PIERRE MARIN VICTOR RICHARD DE (1812-83), French poet and prose author, issued his first efforts in religious poetry as *Les Parfums de la Madeleine* (1839). *La Colère de Jésus* (1840) was followed by *Psyché* (1842), an endeavour to express Christian teaching in Hellenic myth. He also published *Idylles héroïques* (1858), *Les Voix de Silence* (1865), and other poems. His prose works include *Le Sentiment de la Nature avant le Christianisme* (1866), and *Le Sentiment de la Nature chez les Modernes* (1868). See Biré's *Victor de LaPrade* (1886).

Lapse. If a legatee or a devisee under a will predeceases the testator, the legacy or devise will generally lapse or sink into the residue of the testator's estate. But in England, if a testator leaves an estate tail or quasi-entail to A, and A predeceases the testator, leaving issue, who would have inherited if A had lived, the devise does not lapse, but takes effect as if A had died immediately after the testator. And if a testator leaves any real or personal property to his child or issue, and such child or issue predeceases the testator, leaving issue, the devise does not lapse, but takes effect as if the child or issue had survived the testator.

Lapwing, a name sometimes applied generally to the members of the genus *Vanellus*, and sometimes restricted to one species, *V. cristatus*, the British peewit, lapwing, or green plover. The name lapwing is given to the bird

on account of the slow flapping of the wings, while peewit is derived from the familiar cry. As a breeding species the bird occurs throughout Europe and Northern Asia. The upper parts of the body are green, as is also the crest, the throat and upper part of the breast black, while the white of the rest of the under



Lapwing or Peewit.

surface is repeated on the cheeks and sides of the neck, and on the upper surface of the tail. The four eggs are laid in a depression of the ground without any nest; but the watchful care of the parents, and the artifices by which they seek to divert attention from eggs or young, are familiar to all. The food consists of worms, insects, and slugs. For allied forms, see PLOVER.

Lar, or LAAR, cap. of Laristan prov., Persia, 137 m. N.W. of Bender Abbas. It has a fine bazaar, and trades in tobacco, grain, and cotton. Pop. about 10,000.

Lar, or LARS, an Etruscan and Roman prænomen or first name, borne by Porsena, Tolumnius, and others. It is said to have meant 'king.' See Verger's *Etrurie et les Etrusques*, and Müller Deecke's *Die Etrusker*.

Laraiche, or EL ARAISH, fort. port, cap. of Azgar prov., Morocco, at the mouth of the El Kus, 45 m. S.S.W. of Tangier. Exports bird seeds, pulse, wool, hides, and wax. Adjoins the ruins of ancient Lixus, or Shammish. The gardens of the Hesperides were supposed to be near at hand. Pop. 6,500.

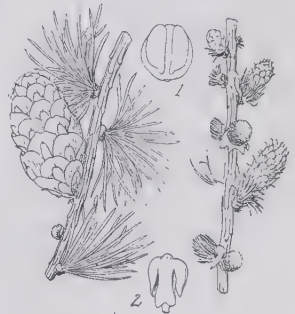
La Ramée. See OUIDA.

Laramie. (1.) Town, Wyoming, U.S.A., cap. of Albany co., on Laramie plains, 15 m. N.W. from Cheyenne. Alt. 7,153 ft. Livestock rearing and machine works. Pop. (1900) 8,207. (2.) Mountains, a range of the Rocky Mts., in Colorado and Wyoming, U.S.A. Beginning as the Rattlesnake Range, it extends E. to the North Platte R., curves S.E. to the Laramie R., and finally runs S. to Colorado,

the culminating point being Laramie Peak, 10,000 ft. Coal is the chief mineral.

Larceny consists in fraudulently taking possession of the goods of another with a felonious intent to deprive the owner of his property in them. Larceny is practically confined to personal property, and does not extend to *fera naturæ* in which there is no property. It may be simple or compound. In the latter case it is accompanied by aggravating circumstances, either of means (violence), of place (a ship or a church), of persons (larceny by a postman), or of the thing stolen (larceny of cattle). Formerly petty larceny consisted in stealing articles not worth twelve pence, grand larceny in stealing articles above that value.

Larch, or LARIX, is a genus of hardy, deciduous, coniferous trees of very graceful habit. They bear monœcious flowers, the male catkins being small and oval, whilst the female ones are much longer. The leaves are bright green, linear, soft, and usually produced in short bundles on each side of the spray. They appear very early in the spring. The timber, which is very hard and tough, is much used in shipbuilding and for railway sleepers, and in cabinet work is capable of taking a very high polish. The species most commonly planted is *L. europæa*, which grows to about a hundred feet in height. Other



Larch, Cone and Flowers (male and female).

1, Scale of cone with two seeds; 2, anther.

species are *L. occidentalis*, a tall and handsome American tree; *L. leptolepis*, a much smaller tree from Japan; *L. americana*, the so-called black larch of America; and the Russian *L. Ledebourii*.

Lard is pig's fat that has been melted and strained to remove the connective tissue in which it was supported when in the animal. It consists of a mixture of the glycerol esters of stearic, palmitic, and oleic acids, the olein being removable as 'lard oil' by pressure.

Lard is of varying qualities, that obtained from the fat surrounding the kidneys (bladder lard) being the best. It is a soft, white grease that is almost free from odour, and melts about 40° c. to a clear liquid. It is often adulterated with water, cottonseed oil, or beef fat. Lard is used in pharmacy as a basis for ointments, and the oil as a lubricant.

Lardner, DIONYSIUS (1793-1859), writer of popular scientific works, born at Dublin. He devoted himself chiefly to literary and scientific work, and is now best remembered as the initiator and editor of *Lardner's Cabinet Cyclopaedia* (133 vols. 1830-49), to which he contributed many articles. His other works include *A Treatise on the Differential and Integral Calculus* (1825); and *System of Algebraic Geometry* (1823), *Astronomy* (1855-6), and *Optics* (1856).

Lardner, NATHANIEL (1684-1768), English Nonconformist divine, was born at Hawkhurst, Kent; studied at Utrecht and Leyden, and, after his return, joined the Unitarian Church. The publication of his *Credibility of the Gospel History* (1727) at once placed him in the front rank of Christian apologists. Other works were: *Collection of Ancient Jewish and Heathen Testimonies to the Truth of the Christian Religion* (1764-7); *History of the Heretics of the Two First Centuries* (1780), published posthumously. See *Life and Works*, by Kippis (1788).

Lareau, EDMOND (1848-90), Canadian politician and author, born at St. Grégoire, Quebec; was called to the bar (1870), became professor of civil law at McGill University (1876), and entered the Legislative Assembly of Quebec (1886). He wrote, in French, histories of Canadian law (1872) and literature (1874).

Laredo. (1.) Coast tn., prov. Santander, Spain, 20 m. from Santander, on coach road to Bilbao. The principal industries are fish-preserving and manufactures of rope and sails. Pop. 5,070. (2.) City, Texas, U.S.A., cap. of Webb co., 150 m. W. of San Antonio, on the l. bk. of the Rio Grande, opposite Nuevo Laredo, Mexico, with which it is connected by two steel bridges. It has considerable trade with Mexico. Pop. (1900) 13,429.

Lares, THE, were objects of worship at Rome; they were divided into two classes, family *lares* and public *lares*. The name appears to be identical with the Etruscan *lar*, 'king;' and the *lares* are similar to the Greek heroes. As worshipped in families, they represent the spirits of departed ancestors, though only good spirits were

lares. Of the public *lares*, some protected the whole city, others its different districts. See Marquardt and Mommsen's *Handbuch d. Römischen Alterthümer*; Granger's *Worship of the Romans*; and Keightley's *Mythology of Ancient Greece and Rome*.

Largo, a term in music indicating a slow degree of tempo combined with great breadth and dignity of style. *Larghetto*, the diminutive, means a little quicker than *largo*.

Largo, UPPER and LOWER, two coast villages 1. m. apart, and par. (7,371 ac.), S.E. Fifeshire, Scotland, 8 m. S.E. of Cupar, and at foot of Largo Law (965 ft.). Industries are fishing, linseed-crushing, and net-making. Alexander Selkirk, the original of Robinson Crusoe, of whom a life-size bronze statue was erected in 1885, was a native. Pop. of par. (1901) 2,046.

Largs, seaside resort and mrkt. tn., on N. Ayrshire coast, Scotland, 6 m. S. of Wemyss Bay. Here Alexander III. of Scotland defeated Haco of Norway (1263). Pop. (1901) 3,246.

Lari, tn., prov. Pisa, Tuscany, Italy, 15 m. E. of Leghorn, in wine-producing district; has hot springs. Pop. (1901) 12,432.

Lario Lake. See COMO.

Larissa, the name of several towns in ancient Greece, of which the most important was Larissa in Thessaly, on the river Peneus. It was also the name of the citadel at Argos. The frequency of the name suggests that originally its meaning was 'fortress,' or the like. Modern Larissa, in Larissa prov., is on r. bk. of the Salambria (Peneus), 35 m. N.W. of Volo; has manufactures of silk and cotton. Pop. 15,373. See Bursian's *Geographie d. Griechenlands* (1862-71), and Tozer's *Lectures on the Geography of Greece* (1873).

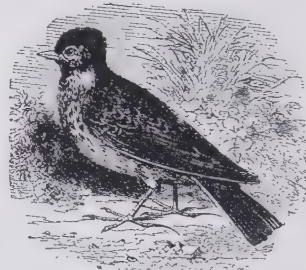
Laristan, maritime prov. of Persia, between the Persian Gulf in the S. and Farsistan and Kirman in the N. Estimated area, 20,000 sq. m. It is an arid and sandy waste, interspersed with salt steppes. Camels are reared, and silk is manufactured. The capital is Lar.

La Rive, AUGUSTE DE. See RIVE.

Larivey, PIERRE (c. 1540-1612), French dramatist, was the author of prose plays, largely taken from the Italian, the best being *Les Esprits*. His work probably influenced that of Molière. The plays appear in *L'Ancien Théâtre Français*, edited by Viollot le Duc. See Macgillivray's *Life and Works of Pierre Larivey* (1889).

Lark, passerine bird belonging to the family Alaudidae. In all, the first toe has a very long, straight claw; the wings are long and pointed, as are also the inner

secondaries of the wing. Many of the larks are desert birds, as, for example, *Alauda desertorum* of N. Africa; others, such as the woodlark (*Alauda arborea*), haunt wooded country; while the common skylark (*A. arvensis*), famous for its powers of song, prefers open districts. There are about a hundred species, almost all confined to the Old World.



Common Skylark.

Larkhall, tn., Mid Lanarkshire, Scotland, near the Avon, 3 m. S.E. of Hamilton. Coal-mining and brick and tile making industries. Pop. (1901) 11,879.

Larkhana, chief tn. of Shikarpur dist., Sindh, Bombay, India, 53 m. S.W. of Jacobabad; a fortified town. The neighbourhood, from its productivity, is known as the 'Eden of Sindh.' Manufactures cotton, silk, leather, and paper. Pop. 13,000.

Larkspur, a popular name for plants belonging to the genus Delphinium.

Larnaca, or LARNAKA (anc. *Citium*), chief seap. of Cyprus, on the S. coast, 25 m. S.S.E. of Nicosia. The harbour has two iron piers for small vessels. Large vessels have to lie in the roadstead. Birthplace of the Stoic Zeno. Exports include grain, cotton, fruit, and gypsum. Pop. (1901) 7,964. See CITIUM.

Larne, mrkt. tn. and seaside resort, Co. Antrim, Ireland, N.W. of the entrance to Lough Larne. Industries: bleaching, linen and woollen weaving, alumina works, and paper-making. There is daily communication by mail steamer (shortest sea passage) with Stranraer, Scotland, 39½ m. distant. Pop. (1901) 6,670.

La Rochefoucauld, FRANÇOIS, DUC DE (1613-80), Prince de Marillac, a descendant of one of the most ancient families of France, was born in Paris. At the age of sixteen he joined the army. Under the influence of Mme. de Chevreuse he took part in the intrigues against Richelieu, which resulted in his being exiled to Verteuil (1637-9). Subsequently, a liaison with the beautiful Madame de Longueville (1645) encouraged his

participation in the Fronde (1648). He was badly wounded at the siege of Paris, and again in 1652 at the fight at the Porte-Saint-Antoine. After twenty years of fighting and intriguing, he retired from public life, and passed his leisure in the elaboration of his *Mémoires* and *Maximes*. He died at Paris. An unauthorized issue of his *Mémoires* appeared in 1662, but only a third of it was the work of La Rochefoucauld, and nothing like a correct edition appeared till 1817. In literary merit and historical value these *Mémoires* rank among the best of their time. The first edition of the *Réflexions ou Sentences et Maximes Morales* appeared in 1665, and contained 317 maxims, expanded in later editions to about 700. Of the literary quality of the *Maximes* there has never been question. In their union of perspicuity, terseness, and polish they are unsurpassed; and the acuteness of their thought is as remarkable as their literary excellence. The *Maximes* do not pretend to be a system of ethics. His *Oeuvres Complètes*, ed. Gilbert and Gourdault (*Coll. de Grands Écrivains*), appeared in 1868-83. See Bourdeau's *La Rochefoucauld* (1895); Sainte-Beuve's *Portraits de Femmes* (new ed. 1856); and Prévost-Paradol's *Études sur les Moralistes Français* (1865).

Larochejaquelein, HENRI DU VERGIER, COMTE DE (1772-94), one of the constitutional guard of Louis XVI.; took command of the La Vendée royalists (1793), and distinguished himself heroically at Fontenay, Saumur, Chantonnay, Laval, La Flèche, and Le Mans, in a vain struggle to resist the republic. He died at the battle of Nouaillé.

Larochejaquelein, LOUIS DU VERGIER, MARQUIS DE (1777-1815), brother of the preceding, left France during the revolution, but returned in 1801. Napoleon failed to win him over, and in 1813 he led the royalists of La Vendée and Poitou, being one of the first to recognize the Bourbons (1814). He led the Vendean troops during the 'hundred days,' and died at Pont-de-Mathis. His wife, Marie Louise Victoire, wrote interesting *Mémoires* (1815; new ed. 1859).

La Rochelle. See ROCHELLE.

Larousse, PIERRE ATHANASE (1817-75), French lexicographer, taught in a large institution at Paris, and for its library he produced many valuable educational works, including the *Grand Dictionnaire Universel du XIX. Siècle* (1866-76; a new and abridged ed. *Nouveau Larousse Illustré*, 1898-1904). Lesser works are the *Nouveau Dictionnaire* (30th ed. 1876), and *Dictionnaire complet Illustré* (new ed. 1895-6).

Larrea, a genus of tropical evergreen shrubs, with yellow flowers, belonging to the order Zygophyllaceae. *L. Mexicana* is the creosote plant of N. America, whose powerful smell protects it from animals.

Larrey, DOMINIQUE-JEAN, BARON (1766-1842), French surgeon, born at Baudéan; studied under Desault and Sabatier; became military surgeon-in-chief at the age of twenty-six, and passed through campaigns in Italy, Egypt, Germany, Spain, and Russia. He instituted 'flying ambulances' (1793), and did much to further surgery.

Larsen, KARL HALFDAN EDWARD (1860), novelist and humorist, one of the finest stylists of modern Danish literature. His best books are those in which he describes the countries in which he has travelled, notably *Modet og den blank Klinge*, an account of his Spanish tour, and *Poetisk Tyskland*. Latterly, in *Dr Ix* (1898), he attacks the hyperæstheticism of the day.

Larut, dist. of the British protected state of Perak, in the Malay Peninsula, about 60 m. from Penang, 4° 35'-50' N. lat. Rich in tin mines. The district is under the control of an assistant British resident. Port Weld is the main port, and there is railway communication thence with Thaiping in the interior.

Larva (Latin, a mask), a name which was originally applied only to the young stages of insects when these differ strikingly from the adults in appearance, but which by extension is now generally applied to the young of animals when they do not closely resemble their parents. Thus the tadpole is the larva of the frog, the maggot is the larva of the fly. It is, however, a necessary part of the definition of the term that the young be adapted for a free-living existence, usually under conditions differing from those to which the adult is fitted. Thus it would be incorrect to call the developing chick within the egg a larva, though it differs in very many points of structure from the adult bird. In this case the term embryo would be employed, for the embryonic chick is quite incapable of life apart from the membranes which envelop it and enable it to breathe, and from the yolk by which it is passively fed. On the other hand, the tadpole or caterpillar has each its own breathing organs, and each is capable of seeking its own food. Where the larva differs very markedly from the adult, there is usually a process of metamorphosis, by means of which it is converted into the adult form.

A point of great interest in regard to larvæ is that in many cases they possess organs which are absent from the adult, but which were presumably present in the ancestral form. Thus, while a frog has no gills, a tadpole has gills, such as the ancestor of the frog doubtless possessed. In such cases the larva is stated to illustrate recapitulation.

Larvæ. See LEMURES.

Laryngismus stridulus (synonyms: 'false croup,' 'spasmodic croup,' and 'child crowing'), a spasmodic affection of the laryngeal muscles, by the contraction of which the glottis is almost closed and inspiration is temporarily arrested. The condition is due to nervous derangement, and is often associated with infantile convulsions, being closely allied to the epilepsy of children. In the great majority of cases the child recovers when apparently just at the point of death. The carbon dioxide accumulated in the blood acts as a sedative and antispasmodic to the nervous system, with the result that the spasmodic contraction is relaxed. During an attack antispasmodics, such as warm baths and inhalations of steam or of nitrite of amyl, generally hasten recovery, while an emetic is frequently of service.

Laryngoscope, a small circular mirror attached at an angle of about 120° to a slender handle, by which in examinations of the throat it is placed in the pharynx with its back against the uvula, and so manipulated that its surface reflects the interior of the larynx, or when inverted, that of the naso-pharynx. The instrument was invented (c. 1855) by Manuel Garcia (b. 1805, and still alive), a teacher of singing, who used it primarily to observe the mechanism of his own vocal organs during phonation. (See VOICE.) Soon after its invention Dr. Czermak, Pesth, introduced the laryngoscope into medical practice, in which it is much used as an aid to diagnosis in laryngeal and post-nasal diseases.

Larynx. A larynx first appears in Amphibia. It is slightly represented in the lower forms, but reaches considerable differentiation in the Anura (frogs and toads), where vocal cords are present; and the croaking sound which the animals produce is often intensified by sacs placed at the angle of the jaw. Reptiles do not display any advance in structure as compared with amphibians. In birds the conditions are remarkable, for an upper and a lower larynx are both present. The lower larynx or syrinx is the organ of voice, and is of complicated structure. It lies at the lower end of the trachea, or at

its junction with the bronchi. A structure homologous with the larynx of other vertebrates lies at the top of the trachea, but it is rudimentary, and is incapable of producing sound. The larynx is well developed in all mammals, and is peculiar in always possessing an epiglottis and a thyroid cartilage. The muscles are also very well developed as compared with other vertebrates. In certain of the Primates—e.g. the howling monkey (*Myocetes*) and the orang—there are large resonating chambers connected with the larynx. In man the larynx lies in the upper and front part

of the neck, between the base of the tongue and the upper end of the trachea. It consists of a tubular framework of nine cartilages, which are connected with each other by joints, membranes, ligaments, and muscles. The largest of these cartilages is the thyroid, which is shield-shaped, and consists of two lateral wings diverging from a vertical central ridge in front. The upper part of the ridge forms the pomum Adami or Adam's apple of the throat, and is more prominent in men than in women, because of the greater size of the thyroid cartilage in the male sex. Above and in front of the thyroid cartilage is a thin leaflike structure, the epiglottis, which during ordinary respiration stands erect at the back of the tongue, but during the act of swallowing is pushed backwards and downwards so as to bridge over the upper opening into the larynx and ensure the passage of food into the gullet behind.

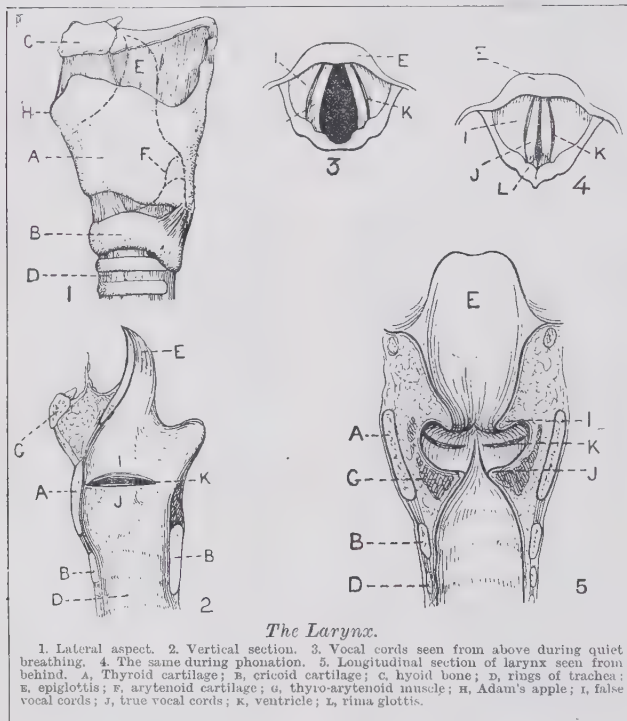
The laryngeal cavity is lined by mucous membrane continuous with that of the pharynx above and the trachea below, but in the larynx the membrane has a double reduplication on each side. The upper folds cover delicate fibrous bands and form the false vocal cords, which get the name

In order that sound waves may be formed, the vocal cords must be parallel, and have a current of air passing between them; they must also be more or less tense, and the pitch of the musical note depends upon the degree of tension of the vocal cords. The range of a voice depends on the extremes of tension which can be imparted to the cords, while the vocal quality is determined by their length and elasticity as well as by the form and size of the resonating chambers. In ordinary speech the larynx is concerned with the production of those consonants which are voiced and of all the vowels, whose differences depend upon adventitious sounds formed by the tongue or lips, or on the introduction of different combinations of harmonics by alterations in the resonating chambers, the mouth, and the pharynx.

The chief pathological affections of the larynx are (1) new formations, (2) paralysis, and (3) various forms of laryngitis. The larynx is frequently the seat of new formations of a simple nature, such as warty growths and polyp, or, on the other hand, malignant and cancerous. Paralysis of one or both vocal cords may result from pressure upon the laryngeal nerves by aneurisms or other swellings in adjacent organs. Laryngitis may be acute, and may be merely a part of a general catarrh of the respiratory mucous surfaces; or it may be more chronic, as in the form known as clergyman's sore throat. An oedematous type of laryngitis also occurs, and is attended by special danger, as the swelling may lead to great dyspnoea and even to fatal suffocation. In grave cases early tracheotomy is advisable. A most intractable and painful form of laryngeal disease is tubercular laryngitis, which, as a rule, occurs only in patients already the subjects of pulmonary phthisis.

Direct injuries to the larynx are most usually caused by foreign bodies drawn in by an inspiration during the act of swallowing. A pin or a tack is apt to cause oedema, while a coin may lie horizontally on the cords and thus choke the patient. Should the foreign body not be coughed up, removal with the aid of a laryngoscope and appropriate forceps may sometimes be successfully carried out, but generally tracheotomy is necessary. See also CROUP.

Lasalle, city of Lasalle co., Illinois, U.S.A., situated in the N. part of the state, on the Illinois R., 100 m. S.W. of Chicago, in the bituminous coal region. Industries: zinc smelting, brick and cement making. Pop. (1900) 10,446.



The Larynx.

1. Lateral aspect. 2. Vertical section. 3. Vocal cords seen from above during quiet breathing. 4. The same during phonation. 5. Longitudinal section of larynx seen from behind. A, thyroid cartilage; B, cricoid cartilage; C, hyoid bone; D, rings of trachea; E, epiglottis; F, arytenoid cartilage; G, thyro-arytenoid muscle; H, Adam's apple; I, false vocal cords; J, true vocal cords; K, ventricle; L, rima glottidis.

of the neck, between the base of the tongue and the upper end of the trachea. It consists of a tubular framework of nine cartilages, which are connected with each other by joints, membranes, ligaments, and muscles. The largest of these cartilages is the thyroid, which is shield-shaped, and consists of two lateral wings diverging from a vertical central ridge in front. The upper part of the ridge forms the pomum Adami or Adam's apple of the throat, and is more prominent in men than in women, because of the greater size of the thyroid cartilage in the male sex. Above and in front of the thyroid carti-

'false' because they are not directly concerned in the production of voice. The lower pair of folds are the true vocal cords, and enclose strong fibrous bands of elastic tissue, known as the inferior thyro-arytenoid ligaments, which run from the arytenoid cartilages behind to meet anteriorly at the centre of the thyroid. Parallel with and outside these ligaments lie the thyro-arytenoid muscles, whose contraction relaxes the vocal cords. Between the false and the true cord on each side lies a pouch-like cavity, the ventricle of the larynx, which in life plays the part of a resonating chamber.

La Salle, RENÉ ROBERT CAVE-LIER, SIEUR DE (1643-87), French explorer, born at Rouen; left France when twenty-three for Canada, where from 1679 he explored the great lakes, the Ohio, and Mississippi, and took possession of their shores in the name of France. Leaving France on further travels (1684), he had difficulties with his escort, and was finally assassinated. A journal of his voyages was published (1723). See Parkman's *La Salle and the Great West* (1869).

Lascar (a camp-follower or soldier; from Hindustani and Persian *laskari*) is now freely applied to sailors of East Indian birth serving on British ships.

Lascaris, ANDREAS JOHANNES, or JANUS (c. 1445-1535), surnamed 'Rhyndacenus.' Coming early to Italy, he was welcomed by Lorenzo de' Medici, in whose service he travelled, and discovered valuable MSS. at Mt. Athos. He was later at the French courts of Charles VIII., Louis XII., and Francis I.; and again at Rome, under the patronage of Leo X. He is best remembered as the editor of several *editiones principes* and a Greek anthology. See Villemain's *Lascaris* (1825).

Lascaris, CONSTANTINE (d. c. 1493), a pioneer of Greek learning in the West. Reaching Italy from Constantinople (1454), he taught successively at Milan, Rome, Naples, and Messina, in which latter town he died. His Greek grammar, *Erotemata* (1476), was the earliest printed Greek book in Italy.

Las Casas, BARTOLOMÉ DE (1474-1566), bishop of Chiapa, Mexico, called the 'Apostle of the Indians,' was born at Seville. After studying at the University of Salamanca, he joined an expedition of Columbus to the W. Indies (1498-1500), and subsequently went to Haiti, where he took holy orders. Repairing to Cuba (1511), after a time he returned to Spain to protest against the prevalent system of employing Indians as slaves. After 1530 he worked incessantly in various parts of Central America, especially in Tuzulutlan, where he successfully established Christian worship and doctrine. After some years spent in Europe, he accepted the bishopric of Chiapa in 1544. He left an unfinished *Historia general de las Indias*, published in the 'Coleccion de documentos inéditos para la Historia de España' (1875-6); *Veynte Razones* ('Twenty Reasons' in support of Indian freedom); *Breveísima Relacion de la Destruccion de las Indias* (1552), and other works. His *Oeuvres Complètes* appeared in Paris (1822). See *Life* by Sir Arthur Helps (1868) and Prescott's *Conquest of Mexico* (1843).

Las Cases, EMMANUEL AUGUSTIN DIEUDONNÉ MARIN JOSEPH, COMTE DE (1766-1842), French historian, born near Revel in Languedoc; entered the navy, but fled to England during the revolution. After Napoleon's accession to power he returned to France, and laboured at the completion of his *Atlas Historique* (1803-4; new ed. 1826). For this work Napoleon made him a baron, employed him in the home administration, and gave him the office of chamberlain. After Waterloo he accompanied the ex-emperor to St. Helena, and there wrote at his dictation the *Mémoires de Sainte Hélène* (1821-3). See his *Mémoires* (1819).

Lasselles, SIR FRANK CAVENDISH (1841), British diplomatist, held subordinate posts in the embassies at Madrid, Paris, Berlin, Copenhagen, Rome, Washington, and Athens before he was sent to Bulgaria as agent and consul-general in 1879. In 1886 he was transferred to Roumania, as envoy-extraordinary and minister-plenipotentiary; and in 1891, with the same high rank, he proceeded to Persia. On the death of Sir R. Morier he was appointed ambassador at St. Petersburg (1894), and since 1895 has been ambassador at Berlin.

Lasco, JOHANNES A., or JAN LASKI (1499-1560), Polish reformer, born at Piotrkow. His uncle, archbishop of Gnesen, conferred many benefices on him; but in 1538 he left Poland, and settled at Emden, where he founded a reformed church. In 1550 he accepted an invitation from Archbishop Cranmer to become pastor of the Dutch church of Austin Friars, London. See Dalton's *John de Lasco* (1886).

La Serena, or COQUIMBO, city, Chile, cap. of prov. Coquimbo, 7 m. from the port of that name. It has smelting works. Pop. 16,500.

Lasiopetalum, a genus of Australasian evergreen shrubs belonging to the order Sterculiaceæ.

Lasker, EDUARD (1829-84), German publicist, of Jewish parentage, filled some posts in the Prussian law courts, and in 1865 entered the Prussian legislature. A member also of the German Parliament from 1867, he became a leading spirit of the national Liberal party. He strove earnestly towards the unification of Germany, and took a chief part in remodelling the judicial system (1867-77). Lasker's chief publication was *Zur Verfassungsgeschichte Preussens* (1874), a collection of essays. See Wolff's *Zur Erinnerung an Eduard Lasker* (1884), and Freund's *Einiges über Eduard Lasker* (1885).

Lasker, EMANUEL (1868), German chess player, born at Berlinchen, Brandenburg. His achievements first attracted attention at the Nuremberg tournament (1883), and became still more notable at Breslau (1889), Nuremberg (1896), London (1899), and Paris (1900). He defeated Blackburne in London (1892), and Steinitz in America (1894), winning the return game at St. Petersburg (1896), and first prizes in tournaments in several cities (1892-1900). Lasker has published *Common Sense in Chess* (1896), and some mathematical essays.

Las Palmas, chief tn. on N.E. shore of Grand Canary I., prov. Canaries, Spain, 60 m. from Santa Cruz de Tenerife, the seat of government. The fine harbour of Puerto de la Luz is 3 m. distant. There is an interesting 16th-century cathedral. Industries include fishing and the manufacture of glass, hats, and leather goods. Exports bananas, potatoes, tomatoes, and oranges, wine, sugar, cochineal, and onions. Pop. (1900) 44,517.

Lassa. See LHASA.

Lassalle, FERDINAND (1825-64), the most brilliant and picturesque of German socialists, was foremost among the founders of the Social Democratic party in Germany. Between the ideas and methods of Marx and those of Lassalle there is great difference. Marx was an internationalist; Lassalle was an ardent patriot, a fanatical advocate of German unity, which gave him influence over Bismarck, and liberalized Prussian domestic politics for a time. The Social Democratic party which he and Marx jointly founded adopted Marx's collectivism as its programme, but it confined itself within national limits. A duel brought his brilliant and tumultuous life to a close at the early age of thirty-nine. He was much more than an agitator; he was a scholar, a man of fashion, and a gallant. The story of his life is the basis of Meredith's novel *The Tragic Comedians*. See Dawson's *German Socialism and Ferdinand Lassalle* (1899).

Lassell, WILLIAM (1799-1880), English astronomer, was born at Bolton, Lancashire. He built an observatory at Starfield, near Liverpool, and constructed a two-foot speculum, with which he discovered the satellite of Neptune (1846). The same instrument disclosed Saturn's eighth satellite, Hyperion (1848), and the inner Uranian satellites, Ariel and Umbriel (1851). In 1861 he mounted a four-foot equatorial reflector at Malta, and catalogued with it, during three years, six hundred new nebulae.

Lassen, CHRISTIAN (1800-76), Norwegian Orientalist, born at Bergen. At Bonn he studied under Schlegel, collaborating with him in the publication of the *Rāmāyana* and *Hitopadesa*. Becoming professor of Indian language and literature there (1830), he devoted himself to elucidating Persian cuneiform inscriptions, and to other kindred recondite subjects. His monumental work is the *Indische Altertumskunde* (1844-61).

Lassen, EDUARD (1830), Danish musical composer, born at Copenhagen; became widely known in Belgium for several notable operatic works and popular songs. After the retirement of Liszt from the Court Theatre at Weimar, the baton was transferred to Lassen. He was the composer of the operas *Le Roi Edgard* (produced by Liszt, 1857), and *Priстан and Isolde* (1874).

Lasso, a plaited rope of raw hide, provided with a running noose at one end, and used in Spanish America and elsewhere by ranchmen and others for capturing or bringing down cattle. Throwing the lasso requires considerable dexterity. The user, who is mounted, causes the open noose to revolve rapidly, and then throws it forward over his quarry's head or horns, retaining the rest of the lasso in coils in his hand.

Lasthenia, a genus of half-hardy annual plants belonging to the order Compositae. They bear heads of yellow flowers in summer. Two of the species are grown in English gardens. *L. glabrata* is the species best worth cultivation.

Lasus, Greek lyric poet, was a native of Hermione in Argolis, and is famous as the teacher of Pindar. Only three lines of one of his poems remain, which can be found in Bergk's *Lyrici Graeci*.

Las Vegas, city of New Mexico, U.S.A., cap. of San Miguel co., in the N.E. of the state, on the plains at the E. base of the Rocky Mts., 50 m. E. of Santa Fé. Important wool market and agricultural centre. Hot springs, 6 m. distant, are much resorted to. Pop. (1900) 3,552.

Latacunga, chief tn. in Leon prov., Ecuador, S. America, in the Andes, between Cotopaxi and Chimborazo, 56 m. S. of Quito. It has frequently been destroyed by earthquakes. Contains former palace of the Incas. Trade in saltpetre. Pop. 15,000 (mostly Indians).

Latakia, or LADIKIYEH (anc. *Laodicea ad Mare*), seaport, in Beirut vilayet, Syria, opposite the N.E. corner of Cyprus. Exports barley, cotton, wax, sponges, and the famous Latakia tobacco. Pop. about 22,000.

Latania, a genus of fan palms, natives of the Mascarene Is. They are tall-growing, bearing at their summit a tuft of handsome, long-petioled, palmately flabelliform leaves. Male and female flowers are borne on separate plants. The chief species are *L. Loddigesii*, growing to a height of about ten feet, the leaves being about three feet long; *L. Verschaffeltii*, with pale green leaves with yellow ribs; and *L. Commersonii*, with deeply-incised leaves.

Lateau, LOUISE (1850-83), Belgian peasant who attained notoriety (1868) on account of her claiming the appearance at periodic intervals of stigmata, or marks on the skin similar to those on the body of our Lord—a condition known to physiologists as 'stigmatic neuropathy.' Periodic bleeding of the stigmata every Friday was a feature of Lateau's case. See Warlomont's *Rapport médical sur la Stigmatisée* (1875).



Boat with Lateen-sail.

Lateen-sail, a triangular sail extended on a yard which is slung about one quarter from the lower end to a mast, and rigged in such a way that the upper end is raised in the air, and the lower end is brought down to form the tack. The word is merely a corruption of 'latin,' and the rig is mainly used in the Mediterranean.

Latent Heat, the name given to the amount of energy which is absorbed by unit mass of a substance as it changes its state from solid to liquid or liquid to vapour. The change is usually effected by the application of heat, and what is observed is that as the change of state is being accomplished the temperature of the mixed states does not change. The explanation of the phenomenon follows at once from the modern view that heat is a form of energy. To liquefy a solid or vaporize a liquid, work must be done in removing constraints, and it is in the doing of this work that energy in the form of heat is consumed. In the reverse processes of liquefaction of vapours and solidification of liquids, energy

in the form of heat is set free. This is usually done by direct abstraction of heat. When, however, these changes of state occur independent of any direct operation of cooling, there is evolution of heat, and the temperature rises. In like fashion, liquefaction of solids and evaporation of liquids are necessarily accompanied by a cooling effect. See HEAT.

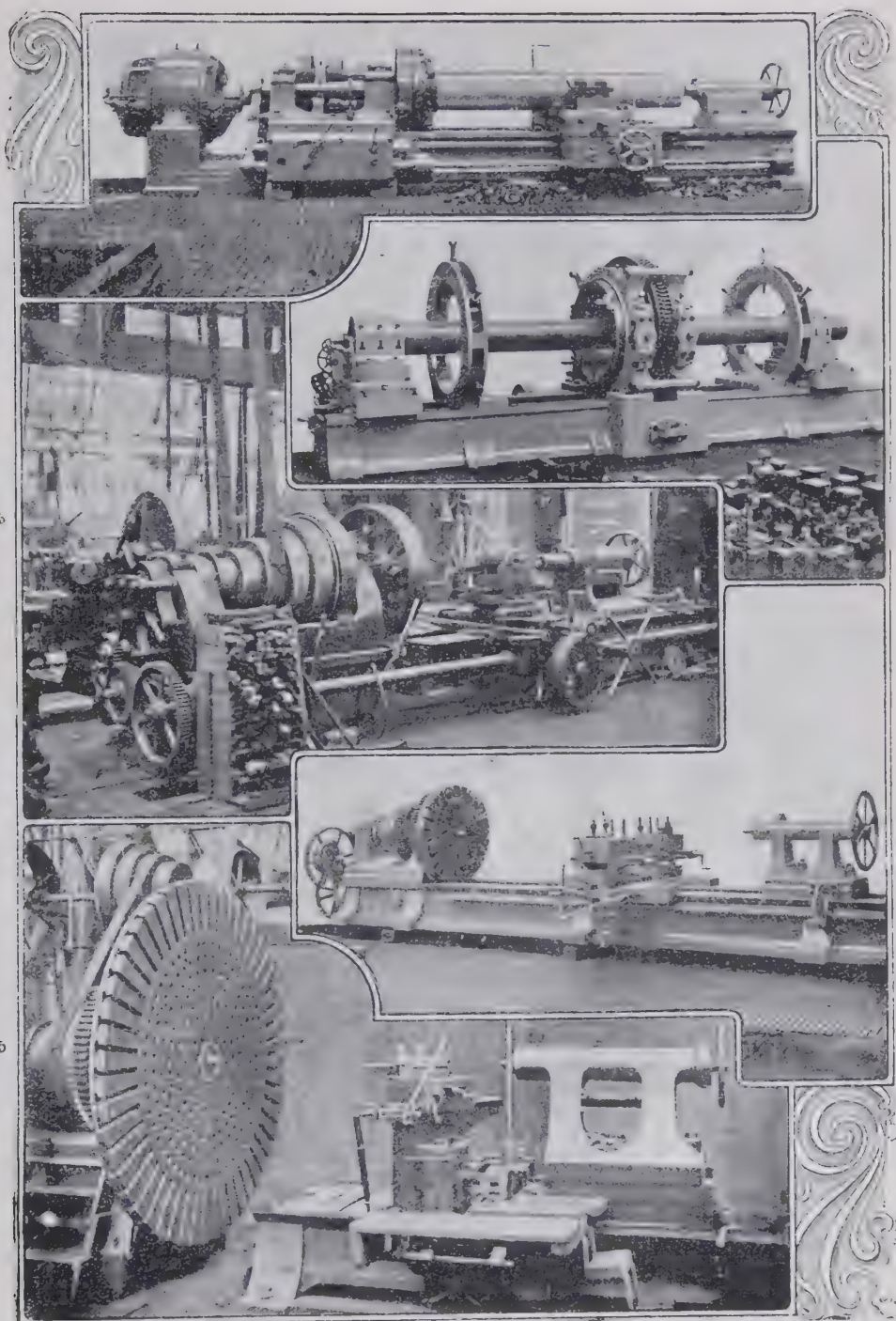
Lateran St. John, a celebrated church in Rome, regarded as the first and most illustrious in the Roman communion. It stands on a site originally occupied by the palace of the Laterani family, which palace was confiscated by Nero, and subsequently was ordained as the patrimony of the popes of Rome by Constantine, and was occupied by them till the 14th century. The present structure is of composite character, but includes a few fragments of the basilica built by Pope Sylvester I. in 324. Here five oecumenical councils have met, hence called Lateran councils.

Laterite. Laterite is a fine red or brown earth, a characteristic surface accumulation of tropical countries such as India, Arabia, and the Sahara. Many laterites are rich in iron oxide; others are aluminous. Chemically, these have a close relationship to bauxite.

Latey, JOHN (1842-1902), English journalist and novelist, born in London, became known through his connection with the *Penny Illustrated Paper*, in which he wrote under the pseudonym 'The Showman,' and of which at his death he was editor. As 'A Silent Member,' he contributed racy papers from the House of Commons Gallery to the *Illustrated London News* (republished 1871). His novels and short stories achieved considerable popularity.

Latham, JOHN (1740-1837), English ornithologist, practised as a physician at Dartford until his retirement in 1796. An ardent naturalist, he was one of the founders of the Linnean Society in 1788. Among his works are *A General Synopsis of Birds* (1781-5), *Index Ornithologicus* (1790), and *A General History of Birds* (1821-8).

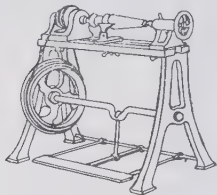
Latham, ROBERT GORDON (1812-88), English philologist, ethnologist, and physician, born at Billingborough, Lincolnshire; became professor of English in University College, London, in 1839. He was the author of *The English Language* (1841), *Natural History of the Varieties of Mankind* (1850), *Man and his Migrations* (1851), and *The Nationalities of Europe* (1863). He was one of the first to suggest a probable European origin for the Aryans.



Some Modern Types of Lathes.

1. Motor-driven lathe at Liège Exhibition (Sir W. G. Armstrong, Whitworth & Co.). 2. Gun-boring machine: the boring bar is stationary and the gun revolves (Armstrong, Whitworth & Co.). 3. Screw-cutting lathe, Thames Iron Works. (Photo by Sturdee.) 4. Gun-turning lathe, with arrangement for turning the taper parts (Armstrong, Whitworth & Co.). 5. Facing lathe, Thames Iron Works.

Lathe, a contrivance for shaping or 'turning' wood, metal, or ivory into forms of a circular or oval section. The simplest form of lathe, and one which is still generally used in India, consists of two rigid centres, between which the object is revolved by means of a piece of cord wound round it, and pulled alternately backwards and forwards. The 'dead-centre' lathe, which was commonly used early in the last century, was but a modification of this primitive form, preserving its chief drawback of an alternating motion. In the modern small wood-working lathe the reciprocating motion of the treadle is converted into rotary motion by means of a crank, which is attached to the axle of a fly-wheel. This in its turn communicates rotation by a driving-belt to a small wheel on the lathe spindle or mandrel, which rests in bearings in a rigid headstock. An object which is to be shaped externally is fixed between the projecting chisel-shaped end of the mandrel and the point of a movable dead-



Lathe for wood-turning.

centre clamped to the bed-plate, being rigidly attached to the first and free to revolve on the latter. With an object which requires internal boring, or turning at the end, the dead-centre is dispensed with, and a chuck or holder introduced, in order to form a firm connection with the mandrel. The fly-wheel of larger lathes is mechanically driven, and transmits motion to the mandrel by means of bevel and gear wheels. For turning metal a 'slide-rest' is employed. This is fixed on the bed-plate of the lathe, along which it is moved by means of a longitudinal screw. An in-and-out motion is given to the upper part—which holds the tool, and slides on the lower portion—by a transverse screw. In mechanically-driven lathes the slide-rest can be made to travel automatically along the bed-plate, thus taking off a complete cut for the full length at each position of the tool. A modification of this principle governs the action of the screw-cutting lathe. See Horner's *English and American Lathes* (1900), Lukin's *The Turning Lathe* (4th ed. 1894), Compton and Good's *The Speed Lathe* (1899), and Haslück's *Lathe Work* (1902).

Lathom, par. and tnsnip., Lancashire, England, 13 m. N.E. of Liverpool. Lathom House, the seat of the Earl of Lathom, is built in the Italian style. The original mansion was famous for its gallant defence by Charlotte, Countess of Derby, in 1644, when she held out against Prince Rupert for four months.

Lathræa, a genus of leafless herbaceous plants belonging to the order Orobanchaceæ. They are natives of Europe and temperate Asia, and are parasitic on the roots of certain trees. The only species found in Britain is *L. squamaria*, the toothwort, with spikes of bluish flowers streaked with red, which appear in March.

Lathyrus, a genus of mostly climbing plants belonging to the order Leguminosæ. The genus includes many species of great garden value. Among them are Lord Anson's pea, *L. magellanicus*, a handsome perennial climber from the Strait of Magellan, bearing purple flowers in summer and autumn; *L. grandiflorus*, an annual species bearing rose-coloured flowers; *L. roseus*, a perennial from Iberia; *L. sylvestris platyphyllus*, the well-known white or purple flowered everlasting pea; and *L. rotundifolius*, with rose-coloured flowers in early summer. Among the British species of lathyrus are *L. sylvestris*, with yellowish and purple flowers; *L. pratensis*, the common meadow vetchling; and *L. maritimus*, a prostrate shore plant.

Latifundia, the plural of a Latin word meaning a large estate. From 200 B.C. onwards the small farmers in ancient Italy found corn-growing less and less profitable owing to the importation of foreign corn. They sold their land, and flocked into Rome and other towns. The land thus came to be held by rich owners in large estates, mostly devoted to pasturage; consequently the rural population diminished. This was the system of *latifundia*, which was one of the chief causes of the decline of Rome and Italy. See Mommsen's *Hist. of Rome*.

Latimer, HUGH (?1485-1555), English reformer. The son of a Leicestershire yeoman, he became a fellow of Clare College, Cambridge, in 1510, and subsequently took holy orders. His first step towards revolt is seen in his severe criticism of the lives of English priests and 'un-preaching prelates'; but the ecclesiastical wrath thus drawn down upon him was counteracted by the favour of the king, Henry VIII., before whom he preached at intervals from 1530 onwards. The emancipation of the country from the Pope's authority in 1534 went far to establish the position of Latimer,

who was free to preach the reformed doctrines throughout the land—a work for which the high merit of his sermons shows him to have been especially fitted. He was appointed to the bishopric of Worcester in 1535, but resigned in 1539. In 1546-7 he was imprisoned in the Tower, but enjoyed a few more years of remarkable success as a preacher before Mary's accession in 1553 threw him again into prison. After much suffering, he went with Ridley to the stake at Oxford. Marked above all by vigour and sincerity, the character and work of Latimer place him high among the world's reformers. An edition of his works was issued by the Parker Society (1844-5). See *Lives* by Gilpin (1755) and De-maus (rev. ed. 1881); also Foxe's *Book of Martyrs*.

Latimer Clark's Standard Cell. See CELL, VOLTAIC.

Latin Empire. See BYZANTINE EMPIRE, ROME.

Latin Language and Literature. 1. *Language*.—The Latin language, originally the speech of the inhabitants of Latium, belongs, like the Greek, to the Indo-European (Indo-Germanic, Aryan) family of speech. It is classified with the Italic group of languages, other members of which are the Oscan and Umbrian and some minor dialects. This Italic group of languages, in vocabulary, declension, and conjugation, presents many points of resemblance to the Greek, so that formerly it was held that the Greek and Italic languages were separate developments of a previous Græco-Italic group; but further investigations have entirely overthrown this theory. It is now clearly proved that the closest affinities of the Italic group of languages are with the Celtic dialects—*viz.*

Welsh, Cornish, Breton, Manx, Erse, and Gaelic. It is the case not only that the Italic and Celtic groups of languages are closely akin, but also that they are the only two groups of Indo-Germanic languages between which any closer connection with each other than with any other members of the family can be shown to exist. The evidences for this proof are that in both the Italic and Celtic groups some members (*e.g.* Latin and Gaelic) show a *c* or *qu*, corresponding to an Indo-Germanic *k*, when other members (*e.g.* Oscan and Welsh) show *p*; that in both groups the passive is formed in the same manner (by the addition of a suffix in *-r* to the personal endings of the active); and that again in both groups the imperfect tenses of all verbs and many future indicative tenses are formed from a stem *-bhu* (*e.g.* *amabam*, *amabo*). These verb forms are absolutely

peculiar to the Italic and Celtic groups; in no other Indo-Germanic language have they been found to occur.

The Latin language resembles the other Indo-Germanic languages in being synthetic and inflectional—i.e. it expresses differences of case, number, and gender in nouns and adjectives, and of person, tense, mood, and voice in verbs, by various suffixes (rarely assisted by a prefix) which have no meaning apart from the form in which they are found, and not by prepositions, auxiliary verbs, and the like, as in English and most modern languages. The Latin declensions of nouns are usually classed as five in number, though a classification into six—viz. of stems ending respectively in the vowels *a*, *o*, *i*, *u*, *e*, and in consonants—would be more scientific. Latin has only two numbers, singular and plural, having lost the original dual (traces of which remain in the forms *duo*, 'two,' and *ambo*, 'both'). It has three genders—masculine, feminine, and neuter. Of the original seven cases (neglecting the vocative) it retains five—nominative, accusative, genitive, dative, and ablative; but the forms of the two last cases are always identical in the plural, and often in the singular (in all *-o* and many *-i* nouns). The Latin verb has lost the middle voice, and has developed a new passive, as has been said. The verb *esse*, 'to be,' is used as an auxiliary along with the perfect participle to express all perfect tenses in the passive. In regard to the moods, Latin has again lost one, the optative, retaining the indicative, imperative, subjunctive, infinitive, and participial, though it is more correct to say that its subjunctive exhibits a confusion of the subjunctive and optative forms and uses. The participial mood is also defective: Latin verbs possess in the active only a present and future, and in the passive only a past participle, against the four participles (present, future, aorist, and perfect) possessed by Greek verbs in each voice. The indicative mood possesses six tenses—present, future, perfect, imperfect, pluperfect, and future perfect. The perfect shows a confusion of perfect and aorist uses; but in the imperative only a present and future, in the subjunctive only present, imperfect, perfect, and pluperfect, and in the infinitive only present, future, and perfect tenses are found. Thus, with a deficiency alike in tense, mood, voice, and number (there being no dual, as in the noun), a typical Latin verb presents a great poverty of forms as compared with a Greek one; the full conjugation of the latter

embraces over 500 distinct forms, that of the former only some 170. Latin has, however, a new development of its own in the gerund and gerundive, forms of which no certain explanation has been given, but which appear to be originally passive participles possessed of special uses. These gerundival constructions are a marked peculiarity of Latin. It may be added that Latin verbs are usually classified into four conjugations, according as the stem ends in *-a*, *-e*, *-i*, or a consonant. The first three conjugations present few irregularities, but the last includes many irregular verbs, whose varieties are due chiefly to the various methods of forming the perfect stem which prevail in Latin, and also to various formations of the stem of the future participle active and past participle passive. The remaining parts of speech do not call for particular attention.

The Latin alphabet was derived from that used by the Greek colonists in Italy, and most probably from Cumæ in Campania. Some authorities hold that it passed from Cumæ to the Latins through the Etruscans, but, on the whole, this is unlikely. The forms of the Latin letters exactly correspond with those used by the Chalcidic Greeks of Cumæ, except in regard to P and G. This origin of the Latin alphabet explains its difference from that used by the Greeks proper, though the signs for the capital letters are identical in most cases. The original Latin alphabet consisted of twenty letters, A B C D E F H I K L M N O P Q R S T V X, G having originally the sound of G, as its continued use as the initial of the name Gaius proves; so too Cn. as the initial of Gnaeus. In time C usurped the place of K, which continued to be used only in a few words, such as *Kalendæ* and *Keso*. In 312 B.C. Appius Claudius the censor introduced the new sign G to represent the *g* sound; it was placed in the alphabet between F and H. I was the sign both of the vowel and of the consonant *i*, as was V both of the vowel and consonant *u*; the signs J and U were not introduced till the middle ages. In Cicero's time Y and Z were added to the alphabet in order to transliterate Greek words. Thus the full alphabet consisted of twenty-three letters, the twenty above mentioned, and G, Y, and Z. In ancient times, at least in careful writing, the capital forms of the letters alone were used, whether in the style called capital or uncial; but as early as the 1st century A.D., and probably earlier, a form of cursive writing in small letters was in use—examples of it may be seen in the

grafiti, or wall-writings, at Pompeii—which developed into the small letters as now used.

These letters of the Latin alphabet may be divided as follows:—Vowels—*a*, *e*, *i*, *o*, *u*; consonants—first dental stops, *t*, *d*; secondly, labial stops, *p*, *b*; thirdly, guttural stops, *c*, *k*, *q*, *g*; fourthly, spirants, *f*, *s*, *h*, and the consonantal *i* and *u*; fifthly, liquids, *l* and *r*; and lastly, nasals, *m* and *n*. *z* is merely the combination of *k* (or *c*) and *s*. *y* represents the Greek *v* (sounded like the French *v*), and *z* the Greek *z*. The diphthongs are *ai*, *ei*, *oi*, *au*, *eu*, and *ou*; but by the Augustan period *ai*, *ei*, *oi*, *ou* had become *ae*, *ie*, *oe*, and *u*. The classical pronunciation of the letters is satisfactorily established; it is as follows:—The vowels *a*, *e*, *i*, *o*, *u* were pronounced as in Italian, though *ē*, *ī*, *ō*, *ū* were open sounds, *ē*, *ī*, *ō*, *ū* close sounds. The pronunciation of the diphthongs *ae*, *oe*, *au*, and *eu* was that of the component vowels pronounced in quick succession. Of the consonants, *t* and *d* were pronounced as true dentals (i.e. with the tongue touching the teeth, not the roof of the mouth, as in English); *p* and *b* corresponded to the English sounds; *c* and *g* were always hard (e.g. Cicero was pronounced Kikero, *genius* with *g* as in 'get'); *q* usually occurred before *u*, being pronounced as in English; *f* was as in English; *h* was a weaker sound than the English, tending to disappear, as it has in the Romance languages; *s* was always the sharp sound, as in 'this,' never as in 'these'; the consonants *i* and *u* were pronounced like the English *y* and *w*, though the latter was perhaps a weaker sound, such as is heard in the French *oui*; *l* and *r* were as in English, except that *r* was strongly trilled; at the beginning of a word *m* and *n* were sounded as in English, but at the end of a word or syllable were weakly sounded; in such positions *m* or *n* is written indifferently in inscriptions, as, for example, *comparo* or *comparo*. The weakness of the sound *m* at the end of the word is illustrated by the fact that in poetry a syllable ending in *m* is elided just as if it ended in the vowel alone.

The Latin accent differed from the Greek in being a stress accent like that of English or modern Italian. In classical times the rule of the accentuation of words was very simple—viz. that in all words it fell on the penultimate syllable of a word of two or more syllables if that syllable was long, but if it was short, on the antepenultimate if the word contained three or more syllables—e.g. *amābo*, but *amābītis*. There are traces, however, of an earlier

system of accentuation in Latin, according to which the first syllable of each word bore a strong stress accent. Thus, in most verbs compounded with prepositions, the vowel of the verb stem is weakened in the compound—e.g. *facto*, but *inficio*; *ago*, but *adigo*, etc. In later compounds, such as *calefacio*, the vowel is not changed. In the last stages of the Latin language the stress accent seems to have become even stronger, which accounts for the fact that in some Romance languages words have frequently lost syllables which preceded or followed that which bore the accent—e.g. Fr. *frère* from *frater*, *chant* from *cantus*, *amons* from *amamus*, etc.

Regarded from the point of view of its sound, the Latin language was less euphonic and heavier than the Greek—its words possess a greater number of consonants in proportion to vowels; and while Greek words can only end in the consonants *r*, *p*, *s*, and *ξ*, or vowels, Latin words end freely in *l*, *m*, *n*, *r*, *s*, and *l*, and occasionally also in *b*, *c*, and *d*. The proportion of long to short vowels is also greater than in Greek, and the variety of vowel sounds (including diphthongs) is smaller. As a result, the Latin language loses something in elegance, variety, and lightness; but it gains, if not proportionately, in weight and dignity. Latin poetry, written in metres borrowed from Greek poets, moves with a certain lack of freedom; but as manipulated by its greatest masters, such as Horace and Virgil, it attains a majesty and solemnity unsurpassed by the poetry of any language.

The Latin vocabulary again, as compared with the Greek, is deficient. Roman writers themselves were well aware of this deficiency, like Lucretius, who complains of the *patri sermonis egestas*, 'the poverty of our native speech.' This deficiency is due partly to the positive lack, first, of certain forms, such as the dual number in nouns, the optative mood in verbs, the aorist tense, and several participial tenses, which seriously diminish the shades of expression possible to the language; partly also to the absence of many words denoting abstract ideas—thus practically all terms of philosophy, science, grammar, and literary criticism had to be adopted from the Greek; but chiefly, perhaps, owing to the inability of the language for forming compounds. In Latin, compounds of verb and preposition are frequent, but compounds of two noun stems, or of a noun and verb stem, are rare; certainly they cannot be formed at will, as in Greek. In terms of law, administration, and

warfare—the true spheres of Roman genius—the language is rich and abundant. Generally it may be said that the vocabulary suited the needs of practical life—of the farm, the law court, the assembly, and the camp—and was less adapted to the requirements of the poet, the philosopher, the scientist, and the critic. The best testimony to the usefulness of the vocabulary is its wide adoption by modern languages, such as our own and the German, which are not directly derived from it. As already suggested, Latin increased its vocabulary largely by borrowing from Greek, and also to a less extent by borrowing from other Italic dialects and from Celtic.

The highest qualities of Latin are perhaps to be found in its methods of expression and construction, which again illustrate its practical character. Particularly to be observed are its preference of concrete to abstract expression, its logical arrangement of clauses, and the precision with which it subordinates the subsidiary ideas to the chief thought in the sentence. It may not be capable of expressing delicate shades of meaning, but it certainly does not leave its meaning in doubt. Hence the great value of its study as an instrument of education: the construing of a complex sentence requires as careful and strict an application of rules as the working out of a mathematical problem. In this connection it may be remarked that one of its chief difficulties to the learner is its gradually working up to the main point: the normal rule in each clause is that the most important word, the verb, comes last, and in each sentence the subordinate clauses lead up to the principal thought. Yet, once this difficulty is mastered, the precision of the arrangement makes the meaning easily intelligible. Constructions are almost invariable: the same ideas are expressed, with few exceptions, in the same way. The two main defects of the language, as regards construction, are its lack of articles, either definite or indefinite—e.g. *homo* means 'the man,' or 'a man,' according to the context, which sometimes causes ambiguity; and its lack of a past participle active, which necessitates the use of the cumbersome 'ablative absolute' construction (which also is ambiguous, as *his dictis abiit* may mean 'having said this he went away,' or 'when some one else had said this he went away'), or other circumlocutions. But, on the whole, in virtue of its above-mentioned qualities of logical precision and concreteness, of its terseness—a

page of English usually translates into three-quarters of a page of Latin—its directness and dignity, Latin must be ranked as one of the noblest forms of human speech.

Latin can hardly be said to have possessed any dialects, or, if it had, they have left scarcely any traces. It was, of course, originally the speech of a small nation, the Latins; the aggrandizement of Rome caused it to spread over Western Europe, and to some extent towards the East, but the varieties so produced in it can scarcely be ranked as dialects. It is, however, clear that in many respects the language of the populace differed from the literary Latin which has come down to us in books. This is proved by the fact that many common words in the Romance languages are derived, not from their equivalents in classical Latin, but either from words used in slightly different or special senses in classical Latin, or from words not found at all in the best writers: thus in French *feu* (*focus*), *cheval* (*caballus*), *maison* (*mansio*), *aller* (*adnare*), correspond to the classical *ignis*, *equus*, *domus*, and *ire* respectively; and *battre*, *arriver*, *coucher*, *épée*, and many other similar words, find their derivation in forms not used at all in good Latin. Many verb forms also—such as *recevoir*, *pouvoir*, *savoir*, and the like—show by their form that they are derived from incorrect variations of the true language, which no doubt were current in classical speech.

The purest Latinity is generally held to be that of the first century B.C., represented by writers such as Cicero, Caesar, Sallust, and Livy in prose; Lucretius, Catullus, Virgil, Horace, and Ovid in poetry. The Latin of the first century A.D.—the period often called the Silver Age—shows a degeneration in the admission of foreign, chiefly Greek, idioms and words; and this degeneration increases with the successive centuries. The barbarian invasions did much to corrupt the vocabulary; yet it was not until long after the fall of the Western empire, in 476 A.D., that Latin ceased to be the speech of Italy, and yielded to its descendant Italian. For many centuries longer Latin continued to be the common language of scholars, and, until the 17th century, of diplomats.

The discussion of the Latin language cannot be concluded without the mention of its importance as the mother of the Romance languages. Its relation to them is particularly interesting, as it corresponds with that of the original Indo-Germanic languages to the various Indo-

Germanic tongues, such as Latin itself, Greek, Aryan, Celtic, Teutonic, and the rest; and thus it illustrates the development of their languages from the parent speech. It has been pointed out in a preceding paragraph that the Romance languages descend from the language of the common people, the soldiers and traders who settled in the provinces, and not from the literary language. These Romance languages cover fairly accurately the area of the Western empire of Rome; in the Eastern empire Latin failed to displace Greek. From Britain the Anglo-Saxon invasion expelled the Latin speech, if it had taken root there, as the Saracenic invasions expelled it from Africa. Apart from this some form of Roman speech still marks the ancient limits of Roman rule. These languages are the Italian, French, Provençal, Spanish, Portuguese, Walachian, and Rhaeto-Romanic. For the study of any one of them, and still more for the comparison of any two or more, a knowledge of Latin is indispensable. However, the acquisition of that knowledge is sufficiently demanded by the greatness of the Latin literature, to which we now proceed.

Bibliography.—Philology: Brugmann's *Comparative Grammar* (1888-95), Brugmann and Stolz's *Griechische und Lateinische Grammatik* (1890), Delbrück's *Vergleichende Syntax der indogermanischen Sprachen* (1892), Lindsay's *Latin Language* (1894), Giles's *Manual of Comparative Philology* (1895), King and Cookson's *Sounds and Inflections of Greek and Latin* (1888), Mommsen's *Unteritalische Dialekte* (1850), and Conway's *Italic Dialects* (1897). Grammar: Roby (1887), Gildersleeve (1894), Zumpt (1874), Madvig (1889), Kühner (1879), Draeger (1878), Stolz (1895). Pronunciation: Arnold and Conway (1895), Seelman (1885), and works referred to under PHONOLOGY. Lexicography: Forcellini (1858-79), Lewis and Short (1879), White and Riddle (1869); and Du Cange (1678, for Middle and Low Latin).

2. **Literature.**—The Latin literature, or the literature of ancient Rome—for though the language cannot be called Roman, being shared by the other Latin communities, the literature did not arise until they were merged in the Roman state—possesses a history which covers some seven or more centuries. Its beginning may be dated with almost absolute exactness at 240 B.C., the year in which the first Latin play was exhibited at Rome. Various dates may be assigned for its close, such as 404 A.D., the year of Claudian's death; 476 A.D., the

date of the abdication of Romulus Augustulus, the last of the Western emperors; or 524 A.D., the year in which Boëthius perished. Adopting the last date, so as to include in the present survey his interesting and important work, we assign a duration of over seven and a half centuries to the life of Latin literature. Impossible as it is to draw a rigid line of demarcation between different epochs, we may venture to subdivide the history of Latin literature into three main periods—(1) The Republican Age, from 240 to 27 B.C.; (2) the Augustan Age, from 27 B.C. to 14 A.D., or perhaps rather later; and (3) the Age of the Empire, from, say, 25 to 524 A.D. Yet not all the writers included within these chronological limits can be ranked as classical; narrower limits must be assigned to that part of the literature which merits such a description; and Plautus (fl. 200 B.C.) and Suetonius (fl. 120 A.D.) may be regarded as the first and the last of the great classical authors. Within that period of three centuries all the masterpieces which claim the attention of the world were produced.

(1.) **The Republican Age (240 to 27 B.C.).**—Latin literature, more perhaps than that of any other nation, was essentially imitative and artificial; no doubt in early days rude hymns and ballads were produced, but nothing approaching the rank of literature existed until Greek influence began to make itself felt. It did so by 250 B.C. or so, and for most of the next century Latin literature consisted almost entirely of translations from the Greek. Three names deserve special mention as the founders of the literature—those of Livius Andronicus, Nævius, and Ennius. Of the three it is to be noted that Nævius alone was a native Latin. Andronicus (c. 284-204 B.C.) was a Greek prisoner of war from Tarentum, who took his name, Lucius Livius, from that of the Roman family to which he had belonged when a slave. He was occupied at Rome as a tutor to wealthy families. He translated Greek plays into Latin, the first of which appeared about 240 B.C.; and also translated the *Odyssey*, and, it is to be remarked, into the native Saturnian verse. Rude as this performance no doubt was, it was important as naturalizing in Rome one of the greatest works of Greek genius; it was still used as a schoolbook in the time of Horace. Only a few fragments of it survive. Gaius Nævius (c. 264-194 B.C.) was a figure of greater distinction. He also translated Greek plays, but went further in writing original plays on Roman subjects, and in com-

posing an epic—still in the Saturnian metre—on the Punic wars. Too few fragments survive to enable a judgment of the work to be formed; however, it retained its popularity in the Augustan age, and is said by the Virgilian commentators, Macrobius and Servius, to have been conveyed in large portions by Virgil into his *Æneid*. A masculine strength and dignity mark the few extant fragments. Quintus Ennius (239-169 B.C.) was a native of Calabria; he served in the second Punic war, but only obtained Roman citizenship about 180 B.C.; he was patronized by the great Scipio Africanus. He was the first regular literary man of the Western world—writing on grammar, spelling, pronunciation, metre, and even on shorthand, in addition to his more ambitious works in tragic and epic poetry. The titles of more than twenty of his tragedies and many fragments are known, the latter remarkable for beauty of phrase and a certain grand dignity of style. Even more important was his epic, the *Annales*, a history of Rome in eighteen books, from the landing of Æneas to his own day. In it he used the Greek hexameter measure with such success as to make it for all time the chief Roman metre. If for nothing else, for this his poem deserves fame; but for centuries it retained its hold on Roman readers, even after Virgil's day, though, as compared with the beauty of the latter's poems, Ennius could only show an archaic dignity. The fragments of the poems, several hundreds in number, are marked by their rugged but powerful versification, and the breadth and wisdom of their thought. Nævius and Ennius were followed by two more tragic poets, Marcus Pacuvius (220-132 B.C.) and Lucius Accius (170-c. 90 B.C.), of whom less is known, though Cicero placed the former, and general opinion the latter, at the head of Roman tragedy, which declined after their time.

Comedy at Rome was contemporary with tragedy. Andronicus, Nævius, and Ennius wrote comedies as well as tragedies, but they were excelled in this department by Plautus, Cæcilius, and Terence. Titus Maccius Plautus (254-184 B.C.) wrote perhaps some forty-five plays, of which twenty are extant. All are adaptations, not to say translations, from the Greek, as indeed were also all the works of Cæcilius and Terence. His plays represent every variety of comedy, from the *tragédie bouffe* to the farce. His best works are perhaps the *Amphitryo*, the *Trinummus*, the *Aulularia*, and the *Rudens*—a comedy with an unusually romantic setting. Many

of his plays are coarse, but they possess an inexhaustible fund of animal spirits, wit, and humour. The language is vigorous and pure, and the influence of Plautus on modern comedy is unmistakable. Of Cœcilius (fl. 180 B.C.) little is known; only fragments of his work survive. Terence—in full Publius Terentius Afer (185–159 B.C.)—differed from Plautus in preserving not only the Greek setting but also the Greek spirit and tone in his plays. The comedy of Plautus is Roman in all but origin; that of Terence Greek in all but language, hence his plays were never popular at Rome. They lack vigour and humour; their excellences are those of polish, elegance, character-drawing, and pure diction. Julius Cæsar's criticism of Terence as a 'halved Menander' cannot be improved. All the six plays which he wrote are extant. There were other Roman comedians, such as Titinius (fl. 170 B.C.) and Afranius (fl. 90 B.C.), who wrote thoroughly Roman comedies, not adapted from Greek models; but none of their works survive, and nothing of them except their names is known. After Terence comedy decayed at Rome. Its place was taken partly by the mimes or farces, which do not belong to literature; partly by the satire which was being developed; and largely, too, by gladiatorial shows, which appealed more forcibly to Roman taste.

At Rome, as everywhere else, poetical literature was earlier in date than prose; and at Rome, too, the usual rule obtained that the earliest form of prose writing was devoted to historical records. But Rome's earliest chroniclers, Quintus Fabius Pictor (fl. 215 B.C.) and Lucius Cincius Alimetus (fl. 210 B.C.)—the former the author of a history of Rome from the earliest times to his own; the latter of a contemporary history—wrote their works in Greek. Marcus Porcius Cato (234–149 B.C.) was the founder of Latin prose literature. His works included more than 150 speeches; the *Origines*, a work of discursive history, intermixed with geography, politics, and personal reminiscences; and the *De Re Rustica*, on farming; but only the last is extant. It shows no attempt at style, but much practical sagacity and a dry humour. Historians of the same period (c. 140 B.C.) are Cassius Hemina, Lucius Calpurnius Piso, and Lucius Cœlius Antipater. The works of all of them are lost. About the same period treatises on jurisprudence began to be composed. But the most important literary figure of the second half of the 2nd century B.C. was Gaius Lucilius (180–103

B.C.), the founder of the Roman *satura*—a term the original meaning of which was not satire, but 'a medley,' i.e. a composition of miscellaneous contents, and which was first applied to a rude kind of drama lacking a plot, afterwards to sketches of social life and character, and finally developing into that criticism of popular manners and habits, and even of individuals, which is denoted by the word satire in its modern sense. Lucilius called his satires *Sermones* ('Talks'), a title afterwards adopted by Horace; they consisted of thirty books, describing the life of his time, his travels and adventures, discussing also the literary and grammatical controversies of the day, and really giving the poet's own autobiography. They were written in hexameters of careless construction; Lucilius cared more for speed than for polish. Altogether his work was lacking in finish, and occasionally coarse in its outspokenness. Yet he has the credit of having invented the one original department of Latin literature which has been imitated by such modern writers—not to mention the professed satirists—as Montaigne and Peypys. Only fragments of his works are extant. Nor has any of the other literature of the same period survived, though names of historians are known, and also of orators, such as Scipio the Younger, Lælius, the Gracchi, M. Antonius, and Licinius Crassus, who prepared Roman oratory for its full development in Cicero, who now demands attention. Marcus Tullius Cicero (107–43 B.C.) is in many ways the chief figure in Roman literature; whatever views are taken of his statesmanship, his literary importance, both in his own times and to the modern world, cannot be denied. His excellence is not confined to a single department. Of his speeches, of which the Verrine, Catilinarian, and Philippic orations are perhaps the chief; his treatises on literature, such as the *De Oratore*, the *Brutus*, and the *De Optimo Genere Oratorum*; his philosophical works, like the *De Finibus*, the *De Amicitia*, and the *De Officiis*; and his Letters—any one of these forms of literary production would have sufficed to give lasting renown to any orator, critic, philosopher, or letter-writer undistinguished in any other branch of composition. His letters possess an undying charm, both from the vividness of their style and the complete revelation which they give of their writer's character. They make the age of Cicero better known to us than perhaps any period before the 17th century. It should not be omitted

that Cicero made several attempts in poetry; he translated the *Phænomena* of Aratus, and also wrote a poem on his own consulship, as to which Juvenal's criticism, that he need not have feared the sword of Antony if he had written all his works in the same style, may be accepted. Yet his experiments in poetry assisted one of the greatest of Roman poets—viz. Lucretius, who clearly studied and imitated them. Titus Lucretius (97–53 B.C.) is practically unknown except by his great poem, *De Natura Rerum*; there is a story that he died by his own hand, after having been made insane by a love-potion given him by his own wife, and leaving some books composed in his sane intervals, which Cicero corrected. Of this legend it can only be said that no evidence can be obtained to confirm it. Of his poem—the subject of which is the Epicurean philosophy—it can safely be said that while at its worst it is not poetry at all, but philosophical arguments—and that uninteresting—forced into metre, at its best it reaches a height of majesty unequalled by any Roman poet, and by few poets of any nation. Younger contemporaries of his were Cinna, Calvus, and Catullus, who represent a totally different school of poetry. Of these, Gaius Valerius Catullus (c. 84–54 B.C.) alone calls for notice, as neither of the others is represented by any extant works, though Calvus at least was ranked with him by good judges. Catullus's fame rests chiefly on those of his poems which celebrate his love for Lesbia—poems which, for their direct expression of feeling, have never been surpassed. He also wrote poems on his travels, satirical verses, elegiacs on various subjects, an epithalamium of great beauty, the *Atys*, and an idyll in hexameters on the marriage of Peleus and Thetis. His lyrics are his real achievement in poetry, and in them it is his directness and simplicity of utterance that constitute his strength. His work, which always breathes Roman dignity and force, ends an era in Roman poetry, for a new one to begin some fifteen years after his death with the works of Virgil.

Cæsar (102–44 B.C.) is the chief representative, after Cicero, of the Latin prose of the republic, though his extant work is limited to his *Commentaries* on the Gallic and the civil wars. But his speeches and letters were held to be unexcelled even in that age; he also wrote on grammar, on astronomy, and two attacks on Cato. His *Commentaries* are distinguished by the brevity and brilliance of their style, and by

the skill with which Cæsar, though never stooping to self-laudation, makes them the justification and the monument of his achievements. As a model of pure Latinity, Cæsar ranks with Cicero alone. Other historians of the period were Q. Sallustius Crispus (86-34 B.C.), who wrote two extant monographs on the Jugurthine war, and on the conspiracy of Catiline, and also five books of histories on the period from 79-70 B.C., of which only fragments remain—he closely imitated Thucydides, and based his history on careful researches, but is scarcely a writer of the first rank; and Cornelius Nepos (99-24 B.C.), whose only extant work is a collection of Greek and Roman biographies, whose title to survival has been their suitability for the use of beginners in Latin. The one remaining figure of the republican period is M. Terentius Varro (116-27 B.C.), whose career began before that of Cicero, and ended in the year of the establishment of the empire. Of his 600 or 700 volumes only one on agriculture and six (out of twenty-five) on the Latin language are extant. Most of his works were antiquarian and scholarly rather than literary in the true sense; but the loss of his 150 Menippean satires, and of his *Imagines*, or lives with portraits of celebrated Greeks and Romans—the first recorded instance of the publication of an illustrated book—is much to be deplored.

(2.) The Augustan Age (27 B.C. to 14 A.D.).—The Augustan age is one of those remarkable periods of human history, like that of Pericles, of Elizabeth, of Louis XIV., and of Anne, which are distinguished by the contemporary appearance of several geniuses of a high order. It can boast of five poets of the first rank (Virgil, Horace, Propertius, Tibullus, and Ovid), and of one great historian (Livy), besides minor writers. It differs from the age of Pericles and that of Elizabeth, and resembles that of Louis XIV. in being a period not so much of national achievement and enterprise—Rome's conquest of the world dates before 100 B.C.—as of the recognition of rational greatness; the Romans had then realized their empire of the world, and the 'Roman peace' established by Augustus supplied them with the repose necessary to survey and celebrate their pre-eminence. It is his expression of this Roman spirit that has justified the claim of Virgil to be considered the representative poet of Roman literature. In originality, and in elevation of thought, he certainly does not excel Lucretius; in genuine poetic

force Catullus, and in perfection of form Horace, may rival him; but he alone has fully expressed for succeeding ages the highest aspects of Roman character and genius. P. Vergilius Maro (70-19 B.C.) was a native of Cisalpine Gaul, and thus, like Horace, may have had some non-Latin strain in his blood. His chief works are the *Eclogues*, pastoral idylls in the manner of Theocritus; the *Georgics*, on husbandry, imitated from Hesiod; and the *Æneid*, the model of which is the epic of Homer. It is at once obvious that Virgil owed much to study and imitation of Greek poets, and not of them only, but of Romans like Nævius, Ennius, and Lucretius. But it was not this study that made him great; it was most of all the above-mentioned expression of the Roman spirit, in a lesser degree his perfect mastery of metre and language, and his exquisite sensibility for human weakness and suffering, for honour in word and nobility in deed, that placed him at once among the great poets of the world. His reputation was made even with the publication of the *Georgics*; and the *Æneid* immediately won a renown which has never been obscured, in spite of changes of taste which have at times challenged his pre-eminence. Quintus Horatius Flaccus (65-8 B.C.) was a friend as well as a contemporary of Virgil; but he differs from him entirely in being a thorough man of the world, while Virgil was always a recluse. Whether in his *Odes*, his *Satires*, or his *Epistles*, Horace always shows the same polished worldly wisdom, combined with humour, geniality, good sense, good feeling, and good taste. In perfection of verbal and metrical finish he is not surpassed even by Virgil; he brought Latin lyric metres to such a point that no successor could follow him without imitation, or desert his example without disaster, and thus with him Latin lyric poetry ended. Sextus Propertius (49-15 B.C.) needs less consideration; he wrote four books of elegies, chiefly love poems, of which the first is remarkable as having been written before he was twenty. He owed much to study of the Greeks: the excellences of his poetry are its depth of passion, power of self-revelation, and mastery of metre; its defects are an allusiveness and distortion of phrase which lead to obscurity. Albius Tibullus (54-19 B.C.) is a less ambitious but more natural poet; his work consists of three books of elegiac poems, marked by a true sincerity and delicacy of feeling. Ovid—in full, P. Ovidius

Naso (43 B.C. to 18 A.D.)—is remarkable as the most productive of Roman poets. He wrote both in elegiacs and hexameters; in the former metre, the *Heroides*, the *Amores*, the *Ars Amatoria*, the *Tristia*, the *Ex Ponto*, and the *Fasti*; and in the latter, the *Metamorphoses*. He lacks the imagination, the passion, and the elevation of a great poet; his distinctive qualities are his facility, his apt choice of words, his smooth versification, and chiefly his power of story-telling, which made his works the favourite reading of the youth of both sexes in succeeding ages until the development of the modern novel. These were the great poets of the Augustan age. The names of others like Gallus and Varius are known, though their works are lost; it is, however, certain that in the works of these five authors we possess the highest achievements of Augustan poetry. In prose there is but one outstanding name, that of Livy. Titus Livius (59 B.C. to 18 A.D.) was a native of Padua; his great work was a history of Rome from the earliest times to 9 B.C. It consisted of 142 books, and its composition occupied the historian for over forty years. Only thirty-five books are now extant, viz. 1-10, ending with the third Samnite war (c. 300 B.C.), and 21-45, from 218 to 168 B.C.; of the other books epitomes exist. Livy's merits as a historian are not those of the patient inquirer into facts; indeed, he neglects research, such as the study of ancient documents and monuments, which would have been easily accessible to him, and is content to adopt his facts from his predecessors, merely using his own judgment to decide their differences. But his sense of the majesty and imperial mission of Rome, his insight into character, his mastery of dramatic situation, his power of vivid description, and his varied and flowing style give him a high place among historians who are read for their narrative. His language marks the highest development of Latin prose; it is richer and more flexible than that of Cæsar, yet, though poetically coloured, free from the innovations and eccentricities of later writers. Other historians of the period were Pompeius Trogus (fl. 10 A.D.), who wrote a history of the world in forty-four books, of which a valuable abridgment has come down to modern times; and Velleius Paterculus (fl. 25 A.D.), who wrote a brief history of Rome in two books, which are extant, but of small value. Less important writers were the fabulist Phædrus (fl. 30 A.D.), the survival of whose works was due

to their use as a schoolbook; Manilius (fl. c. 14 A.D.), author of an astronomical poem of some 4,000 lines, rather dull in style, but containing passages of vigorous thought and expression; Celsus (fl. c. 14 A.D.), author of an encyclopædia, of which only eight books on medicine were preserved to become a standard work until recent times; and L. Anneus Seneca (54 B.C. to 39 A.D.), father of the philosopher, and author of some rhetorical exercises, which are chiefly valuable as showing the development of Latin prose. Some of these authors outlived the period assigned to the Augustan age, but the character of their works justifies their inclusion within it.

(3.) The Age of the Empire (25 to 524 A.D.).—For a quarter of a century or more from 20 or 25 A.D., literature appears to have been almost extinct at Rome. But for the next half-century or more after 50 A.D. Rome could show a succession of writers, both in poetry and in prose, not indeed—with the possible exception of Tacitus—of first-rate genius, yet successful enough to win and deserve a lasting fame. Their period is called the Silver Age, as contrasted with the Golden or Augustan Age. The first of these is L. Anneus Seneca (4 B.C. to 65 A.D.), the son of the rhetorician, and himself famous as a moralist. His moral writings are numerous, and contain much lofty thought and deep feeling, very rhetorically expressed. He also wrote nine tragedies, of a purely declamatory type, untrue to life, and unsuited to the stage. It should be remarked that his father and he himself—born at Cordova—were natives of Spain; so, too, were his nephew Lucan, and the later writers Martial and Quintilian. Henceforth Roman literature is not confined to the Latin race, and its language is increasingly corrupted by the influence of the provincialism of its users. M. Anneus Lucanus (39–65 A.D.) is remarkable for the production of his epic, the *Pharsalia*, at such an early age—he was executed for complicity in the Pisonian conspiracy against Nero at twenty-six—for the brilliance of his language, and the force of many of his statements. His poem is a mine for quotations, but it lacks power of characterization, variety of rhythm, and true poetic feeling. Quintilian aptly sums him up as 'better to be imitated by orators than by poets.' Another young poet, and a friend of Lucan, was Aulus Persius Flaccus (34–62 A.D.). His only work consists of six satires, amounting to over 600 lines of verse, marked chiefly by obscurity and acquaintance with books rather than mankind,

but also by moral earnestness, delicacy of feeling, and a genuine delight in secluded study. Another poet of the same period is Titus Calpurnius Siculus (fl. 55 A.D.), who ventured, with some success, to imitate the bucolic poems of Virgil in his *Eclogues*. Prose writers were Lucius Junius Moderatus Columella (fl. 65 A.D.), who wrote a treatise on agriculture; and Petronius Arbiter (d. 66 A.D.), the 'glass of fashion' at Nero's court, and also a capable statesman, whose work, the *Satyricon*, is a sort of novel, remarkable for its pictures of life of every kind, its frequent use of the dialect of the lower orders, its wild humour, and, it must be confessed, also for its flagrant indecency in many passages. With the establishment in 69 A.D. of the dynasty of the Flavian emperors under Vespasian a new school of literature appears, which was distinguished by its learning and its desire to imitate rather than to excel the Augustan writers. First may be mentioned the three epic poets, Publius Papinius Statius (d. c. 95 A.D.), Valerius Flaccus (d. c. 90 A.D.), and Silius Italicus (25–101 A.D.). Statius's poems are a *Thebais* (an epic on the story of Thebes), an *Achilleis* (one on that of Achilles, of which only one book and part of another were finished), and a number of miscellaneous poems called *Silvae*. His epic is highly finished, but tedious; his minor poems are more graceful and pleasing. Flaccus wrote an *Argonautica*, imitated from that by Apollonius Rhodius; but he is so long-winded that even in eight books he leaves the story unfinished. Still more tedious is Silius Italicus, whose epic dealt with the second Punic war in 17 books. He makes historical events depend upon a mythological machinery like that of Homer and Virgil, in a manner so tasteless that he may well be classed as the writer of the worst epic ever written. A very different genius from any of these three was possessed by the epigrammatist Marcus Valerius Martialis (c. 40–104 A.D.), a native of Bilbilis in Spain. His twelve books of epigrams can scarcely be called poetry. Their chief value is the pictures they give of contemporary Roman life; their merit is a neatness of language, and a precision—often laboured—in making a definite point. Of the prose writers of this age, the elder Pliny comes first in point of date. Gaius Plinius Secundus (23–79 A.D.) was remarkable for his unwearied pursuit of knowledge. His works were numerous, including histories of Rome and of the wars on the Germanic frontiers; but only the thirty-seven books of his *Natural History* survive,

which is a priceless collection of facts on every branch of natural science then known. Marcus Fabius Quintilianus (c. 35–95 A.D.) was much more of a literary artist; his life-work was the teaching of rhetoric, and his great achievement is his *Institutio Oratoria*, which is extant. It deals with the practical training of an orator, and, by way of doing so, gives valuable advice on education, and a masterly criticism of Latin literature; it is full of sayings of profound wisdom. Cornelius Tacitus (c. 55–120 A.D.) is really the last great figure of Latin literature, and the greatest of Roman historians. His works include the *Agricola*, a biography of his father-in-law; the *Germania*, a monograph on Germany; the *Annals* and the *Histories*, of each of which only parts survive; and an early work, *De Oratoribus*. The greatness of Tacitus as a historian consists not in his impartiality or true presentation of events—it is more than possible that he has maligned both Tiberius and Claudius—but in his dramatic power and study of character, his moral elevation, and, above all, in the marvellous incisiveness of his style. Many of his phrases have become familiar quotations, and no writer could ever put more meaning into few words. His friend, Pliny the Younger—Gaius Plinius Cæcilius Secundus (61–105 A.D.)—though he plumes himself on his imitation of Tacitus, is merely a man of culture, not of genius; his *Letters* show much polish, but are chiefly of value as a description of Roman society in his time. Gaius Suetonius Tranquillus (c. 75–160 A.D.) is the most important prose writer of the 2nd century; but his *Lives of the Twelve Cæsars* is only a collection of court gossip, valuable for its simplicity, its many anecdotes, and the interest of details about personages so universally famous as the early emperors of Rome. A work of no greater literary value is the *Noctes Attice* of Aulus Gellius (fl. 160 A.D.), which only claims to be read as a collection of extracts from earlier writers and a source of information regarding the studies of the author's age. Juvénal—Decimus Junius Juvénalis—(c. 60–130 A.D.) is a somewhat earlier writer than those just mentioned, but his work may be fitly regarded as the close of original Roman literature. He was the last of the Roman satirists, and the most violent of them all. In his sixteen *Satires* he fully acts up to his own words, 'Indignation inspires my verse.' His satire is based on a thorough acquaintance with Roman life, especially with its seamy side. It is largely to

him that the exaggerated belief in the corruption of Roman morals is due: it is forgotten that large cities in every age have had their sinks of moral refuse. At times he rises to a tone of lofty morality, and many of his maxims have obtained a world-wide currency as quotations. After his time Latin writers cease to exhibit the real Roman character; nor is this remarkable, considering that many had already been, and in the future nearly all were, not Romans at all in nationality, but natives of every part of the empire. Indeed, towards the end of the second century an entirely new Latin speech comes into being; literary Latin had long ceased to be a spoken language, though writers like Quintilian, Pliny the Younger, and Suetonius continued to use the vocabulary of the republican age. But the leading writers of the latter part of the second century A.D. endeavoured to return to the spoken language of their day. Their attempt failed, partly because the great classical writers had fixed the standard of Latin speech for all time, but perhaps more because none of them possessed the genius to do great work. Only a brief review of their names can be given here. First comes Marcus Cornelius Fronto (c. 90-168 A.D.), the friend of Marcus Aurelius, and the most famous rhetorician of his time. Only fragments of his works remain, chiefly from private letters, but also from rhetorical exercises, giving a fair idea of the *elocutio novella*, or 'new style,' of which he was the chief advocate. Apuleius (fl. 165 A.D.), a native of Africa, author of the *Metamorphoses*, a romance containing the beautiful tale of Cupid and Psyche, and of some mystical treatises, is a figure of more interest. About the same time was produced an anonymous poem called the *Pervigilium Veneris*, 'the night-long watch of love,' written in trochaic verse with a tendency to accentual rhythm and even to rhyme; it is a work of great charm and romantic feeling. From this time works on Christian theology begin to form a conspicuous part in Latin literature: the names of Tertullian (c. 150-230 A.D.), Minucius Felix (c. 200 A.D.), and Lactantius (c. 300 A.D.) may be particularly mentioned. Historians had almost ceased to exist; the only names to be mentioned are those of the writers of the *Augustan History*, memoirs of the emperors from Hadrian to Numerian—viz. Spartianus, Capitolinus, Gallianus, Trebellianus Pollio, Lampridius, and Vopiscus; their feeble conception of history is only ex-

celled by the barrenness of their styles. The last historian of Rome was Ammianus Marcellinus (c. 330-400 A.D.), who wrote a history of Rome from Nerva to the death of Valens, of which only eighteen books, containing the history of the last twenty-five years of his period, are extant. He writes with intelligence and honesty, but—Asiatic by birth as he was—his Latin is obscure and difficult. Contemporary with him were the two last considerable poets of Rome, Ausonius and Claudian. Decimus Magnus Ausonius (c. 310-c. 393 A.D.) was of Gallic blood; he rose to high rank in the state, but spent his last days in retirement near his native Bordeaux. His poems are of many varieties, including Christian hymns; but his best works are his *Idylls*, and the flower of the collection, the '*Mosella*,' is remarkable for its Virgilian rhythm and diction combined with a newer feeling for the beautiful in nature. Claudius Claudianus (fl. c. 400 A.D.) was of Asiatic birth, and lived at Alexandria until he came to the court of Theodosius at Milan. Until then he had written only in Greek—a fact which increases our admiration of the purity of his Latin and the wealth of his vocabulary. His poems consist chiefly of short epics on subjects of the day—e.g. *On the Consulate of Stilicho*—other occasional pieces, and a larger unfinished epic in three books on the *Rape of Proserpine*. Claudian is at least the equal of the poets of the Silver Age, both in learning and in technical skill. He was the last conspicuous author who was a pagan. Prudentius (348-c. 410 A.D.), on the other hand, wrote two books of lyrical poems on Christian subjects with much brilliance of execution and earnestness of feeling. Sidonius Apollinaris (c. 430-480 A.D.) is a weaker edition of Ausonius. Finally, Boethius (c. 480-524 A.D.) stands at the parting of the ways between the ancient world and the middle ages. He was the last of the learned Romans who knew Greek, and in his philosophical works—mostly translations of and commentaries on Aristotle—he interpreted that philosopher to the Western world. His claim to rank among Latin authors depends on his *Philosophiae Consolatio*, a dialogue, including thirty-nine short poems, of which both prose and verse are excellent in style, while the teaching conveyed in it is a compendium of the loftiest moral teaching of antiquity. It was one of the earliest works to be translated into the modern languages of Europe, and for centuries exercised a greater influence

than perhaps any one secular work. After his time the Western empire was broken up into the kingdoms of France, Spain, Britain, and the rest, and there ceased to be any unity in Latin literature.

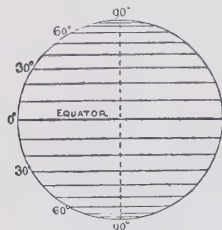
For further information, see articles on CICERO, HORACE, LIVY, TACITUS, and others. See also Teuffel Schwabe's *Geschichte der Römischen Literatur* (Eng. trans. by Warr, 1900); Schanz's *Geschichte der Römischen Literatur bis zum Gesetzgebung des Kaisers Justinian* (1890-1901); Mackail's *Latin Literature* (1895); Tyrrell's *Latin Poetry* (1895); Sellar's *Poets of the Republic* (1889), *Poets of the Augustan Age* (1891), and *Horace and the Elegiac Poets* (1892); and Nettleship's *Essays in Latin Literature*, Series i. (1885), Series ii. (1896).

Latini, or **LATINO**, **BRUNETTO** (c. 1212-94), Italian poet and scholar, was born at Florence, in the politics of which city he played a considerable part. The work to which he mainly owed his contemporary fame is *Li Livres dou Trésor*, written in French (ed. by Chabaille, 1863), one of the many encyclopædias so popular in the middle ages. More important for literary history is the shorter *Tesoretto*, composed in Italian, which introduced the allegorical manner of the *Roman de la Rose* into Italy, and served Dante as a model in several ways. See Ortolan's *Étude sur Brunetto Latini* (1873); Sundby's *Della Vita e delle Opere di B. Latini* (1884); and Marchesini's two works on Latini (1887 and 1890).

Latin Union was a monetary union into which France, Belgium, Italy, and Switzerland (and subsequently Greece) entered in 1865 to maintain a uniform and interchangeable coinage among themselves, and to protect their coinage system against the appreciation of silver relatively to gold, due to the gold discoveries in Australia and California. Silver was for the time being withdrawn from circulation. The terms of the convention were modified by subsequent negotiations—notably in 1874, when the states which were members of the Latin Union agreed to suspend the free coinage of silver. The reason for this change of attitude was that after 1872 a fall in silver began which entirely reversed the situation, and made silver depreciate relatively to gold. The Latin Union still exists, but is in practical abeyance.

Latinus, in ancient Roman legend, was king of Latium when Æneas landed there, and gave him his daughter Lavinia in marriage. See Virgil's *Æneid*.

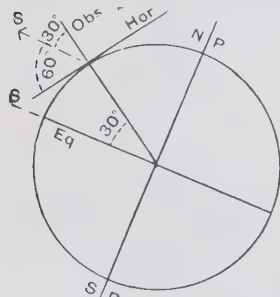
Latitude and Longitude. Latitude is the distance of a place on the earth's surface north or south of the equator, measured in degrees, minutes, and seconds, the equator being represented by 0. In a degree of latitude there



Parallels of Latitude.

are sixty minutes, each possessing the value of a sea mile. A mile at sea therefore, in its exact (as opposed to its accepted) length, is the same as a minute of latitude. The extremities of the earth's axis, the north and south poles, have a value of 90°. Latitude, otherwise expressed, is the angular distance of a place from the equator, measured on a meridian. The following rules furnish the methods for finding the latitude of a ship by observations of the sun, moon, stars, and planets.

(1.) *From the Sun at Meridian.*—By means of the sextant, the sun's image is brought down to the horizon. The observation is taken three or four minutes before noon of the ship's time, which is approximately corrected by the addition of four minutes for every degree of longitude sailed east, and the subtraction of four min-



Latitude 30° N. determined from Sun at Meridian.

utes for every degree sailed west. When the sun's image is found by observation to have reached a point at which it touches the horizon, without dipping below it, the observer calls out 'eight bells,' and the ship's time is set at noon. The observation, how-

ever, should not be concluded until after a short pause, to make sure that the sun has finished its ascent. Having arrived at the corrected altitude, which is called the true central altitude, subtract it from 90°. The result is the zenith distance north or south, as the case may be. Then observe the corrected declination—i.e. the angular distance of the sun from the equinoctial or celestial equator. If the declination be north or south the same as the zenith distance, add the two quantities; if they be of different kinds—i.e. one north and the other south—subtract the less from the greater, and the answer will be latitude north or south, according as the greater quantity is the zenith or the declination.

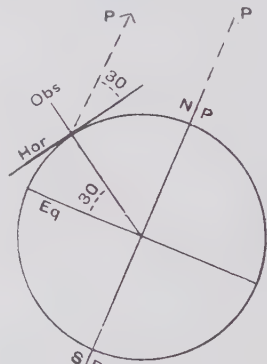
(2.) *From the Sun, ex-Meridian.*—It often happens that the sun at the exact meridian is obscured by a cloud. There are tables, known as Bowditch's *Useful Tables*, by which the variation of the sun's altitude may be found for thirteen minutes of time on each side of the meridian; but the rules for finding the sun's altitude at the meridian by an observation of it at a different time are known to every competent navigator. Ship's time, Greenwich time, and dead reckoning all enter into the calculation.

(3.) *From the Moon or a Planet.*—The method is the same. Meridians, altitudes, zenith distances, and declinations are worked out with reference to Greenwich time, and the principles for determining latitude are as before.

(4.) *From the Stars.*—The quickest and easiest method of determining latitude is from the stars. They are more constant, and declination is almost absent. The few variations which exist are noted in the *Nautical Almanac*. Star tables are worked out for all stars of the first magnitude in both hemispheres, and for all navigation stars of the second and third magnitudes, with the astronomical apparent times at which they cross the observer's meridian on the first day of each month in the year. It should be noted that allowance must be made for the fact that all stars come to the meridian four minutes earlier each day, and also that astronomical hours are twenty-four in number; hence 14 means 2 a.m., 20 means 8 a.m., the first hour starting from noon. Observations should be taken both north and south for verification.

(5.) *From the Pole Star at any Hour.*—The method is to observe the true altitude of the star; to obtain the local apparent time from the ship's chronometer by adding or subtracting four minutes for each degree of longitude

sailed east or west; to convert this time into astronomical time—i.e. counting up to 24 hours from noon; and having got the true altitude and the astronomical time, to obtain the sun's right ascension (which is the distance of the sun, considered in time, from its position at the vernal equinox) from the *Nautical Almanac* for the day. Add the astronomical time and the sun's right ascension. If the result exceeds 24, then subtract 24. Apply this result of hours and minutes to the table of Pole-star corrections, and find the number of degrees and minutes opposite to it with a minus or plus sign. Add this to, or subtract it from, the true altitude already found, and the result is the latitude.

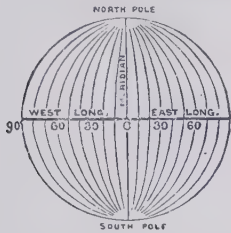


Latitude 30° N. determined from the Pole Star.

(6.) *From an Artificial Horizon.*—This is a method sometimes used on shore. It necessitates the employment of a small trough filled with quicksilver (or of a pan of treacle or liquid tar, for want of anything else). The surface is protected by glass from the wind, so that it is smooth enough to show reflections. Face the celestial body it is desired to observe, and walk backwards until its reflection is seen in the quicksilver. Apply the sextant to the celestial body, and bring its image down so as to coincide with the other image in the trough. The angle shown on the sextant will be double the altitude of the body. Having found the altitude by this means, proceed as usual by the *Nautical Almanac* or other calculations.

Longitude is the distance of any place on the globe's surface from another place, eastward or westward, or, more exactly, the distance of any place from a given meridian, being the arc of the equator intercepted between the meridian of that place and some other fixed meridian, the

one from which longitude is reckoned being usually termed the



Meridians of Longitude.

first meridian. In Britain longitudes are generally reckoned from the meridian of Greenwich. Accordingly, the difference of longitude between two places is equivalent to the difference of the arc of the equator intercepted between their meridians. The determination of the longitude of any place is effected by arriving, in the first place, at the 'time' of the place the longitude of which is desired to be ascertained, also the 'time' of the first meridian, which, on being reduced to degrees, affords the longitude.

See *The Nautical Almanac* (annually, several years in advance); *Roper's Practice of Navigation*; *Martin's Navigation and Nautical Astronomy*; *Inman's Nautical Tables*; *Bowditch's Useful Tables*; *Lecky's Wrinkles in Practical Navigation* (1881); *Gill's Text-Book on Navigation* (1898); and *Norie's Epitome of Practical Navigation*.

Latitudinarians, a name given to a party in the Church of England in the 17th century who strove to find a theological basis broad enough for men of different views to unite upon, and thus to put an end to the embittered controversies of the time. They were sincere Episcopalians, but their views proved unwelcome to High Churchman and Puritan alike, and they found themselves denounced from all sides as Socinians, or even atheists. Their chief representatives were Hales, Chillingworth, Henry More, Cudworth, Whichcote, and Tillotson, and the movement was closely allied to the philosophical school known as the 'Cambridge Platonists.' The Latitudinarians may be regarded as the forerunners of the Broad Church. See *Tulloch's Rational Theology in England in the 17th Century* (1872).

Latium, div. of ancient Italy, bounded on the N. by the Tiber, on the E. by the highlands of Central Italy, on the S. by the Liris, and on the W. by the Mediterranean. Most of the country consists of a plain of volcanic origin, in the middle of which

risks the Alban Mount. The Latins, who were the earliest known inhabitants of this region, were members of the race which inhabited all the Mediterranean coasts. At an early date the Latin cities formed a confederation, the head of which was Alba Longa. Rome was originally a colony from Alba, but at an early date destroyed that city, and afterwards became head of the Latin league. See Mommson's *History of Rome*.

Latona, a British second-class cruiser launched in 1890. Since 1781 there have been naval ships of this name.



Latona. See LETO.
La Tour d'Auvergne, THÉOPHILE MALO CORRET DE (1743-1800), French captain of grenadiers, born at Carhaix, Brittany; distinguished himself at the siege of Port Mahon (1780), also during the wars of 1792-1800. Napoleon named him 'Le premier Grenadier de France.' He was killed at Oberhausen, near Neuburg, Bavaria. He wrote several works on the language and antiquities of the Bretons. See *Simond's Life* (1895).

La Trappe. See TRAPPISTS.
Latreille, PIERRE ANDRÉ (1762-1833), French naturalist, was born at Brives. He was an accomplished entomologist, and arranged the insects in the Museum of Natural History at Paris, and was subsequently professor of natural history there. His most important work is *Précis des Caractères Génériques des Insectes* (1796), but he also wrote on various groups of the animal kingdom. His work on insects was a step towards the natural classification of these forms.

Latten (Old Fr. *laton*, 'brass'), a name given to the sepulchral tables of brass extensively used for centuries in churches to commemorate the dead. Fine examples are to be seen in the gates to the chapel of Henry VII. in Westminster, and on his tomb-screen.

Latter-day Saints. See MORMON CHURCH.

Lattice Leaf, the popular name of a water plant, *Ouvriandra fenestralis*, belonging to the order Juncaginaceæ. The leaves are of open structure, are nearly a foot long, oblong in shape, and float just below the

surface of the water. The flowers are borne in spikes on the surface. The roots of the plant are



Lattice Leaf.

1, Part of flower spike.

used as an article of food by the natives of Madagascar.

Latude, JEAN HENRI MASERS DE (1725-1805), French adventurer, was born at Montagnac, Languedoc. When a young officer, he injudiciously courted the favour of Mme. de Pompadour, by pretending knowledge of a plot against her. Consigned to the Bastille in 1749, he remained incarcerated for twenty-seven years, in spite of several efforts to escape. Afterwards released, he returned to Paris contrary to orders, and was again imprisoned for seven years. See Thierry's *Mémoires de Latude* (1791-2).

Lauban, tn., Prussian prov. Silesia, 13 m. E. of Görlitz. Industries: linen, woollen, cotton, and dye works, railway workshops, and brewing; has a 14th-century convent. Pop. (1900) 13,793.

Laube, HEINRICH (1806-84), German novelist and playwright, early showed revolutionary sympathies, which led to his imprisonment (1834); was the successful director of the Burgtheater (1839-67) and the Stadttheater (1870-79) at Vienna. His plays are of considerable merit, but it is through his novels, which include *Das junge Europa* (1833-7), *Der Präbendent* (1842), and *Die Böhminger* (1880), that he is chiefly remembered.

Laud, WILLIAM (1573-1645), archbishop of Canterbury, the son of a clothier, was born at Reading. Educated at St. John's College, Oxford, he took holy orders in 1600. His ecclesiastical advancement was rapid, and in 1611 he was elected president of St. John's College. In 1614 he received a prebend in Lincoln Cathedral, in 1615 he became archdeacon of Huntingdon, and in 1616 dean of Gloucester. In 1621 Laud received the bishopric of St. Davids. During his tenure of the Welsh see his friendship with Buckingham began, and visits to the court became more frequent. From 1622 he was involved in political life. On the death of James I. Laud speedily secured the confidence of Charles, and was one of his advisers during the stormy period from 1625 to 1629. In 1626 he was made bishop of Bath and Wells, and two months later became dean of the Chapel Royal. From this time the religious policy of Charles I. was guided by Laud. From 1628 to 1633 Laud was fully occupied. The reformation of the church was the object of his heart. Supported by Charles, he compelled all the bishops to retire to their sees; he also carried out many valuable reforms in the University of Oxford. In August 1633 he was appointed archbishop of Canterbury, and was able to continue his policy of reform, with

the result that churches were everywhere improved. His attempt to introduce a service book and canons into the Scottish Church was a decided failure, and enabled the opposition to the royal power to secure the support of the Presbyterians. The opening of the Long Parliament in 1640 was shortly followed by the imprisonment of Laud and Strafford. In 1643 Laud was tried for endeavouring (1) to 'alter the Protestant religion into Popery,' and (2) 'to subvert the laws of the kingdom.' No adequate proofs could be produced; but a bill of attainder was passed against him on Jan. 4, 1645, and a few days later he was beheaded. See Heylin's *Cyprianus Anglicanus* (1668); Mozley's *Essays* (1878); Hutton's *William Laud* (1895); and Simpkinson's *Life and Times of Laud* (1894).

Lauda, the name given to early Italian religious and spiritual songs, which date from the 13th century. The chief writer of the genre at this early stage was Jacopone da Todi. The most remarkable thing about the pieces is that they gradually became more and more dramatic, and thus played an important part in the development of the Italian drama. They were produced in large numbers till well into the 15th century. See Galletti's *Laude spirituali di Belcaro, L. de' Medici* (1863); D'Ancona's *Origini del Teatro Ital.* (1891); and *Rappresentazioni sacre dei Sec. XIV., XV., e XVI.* (1872); Torraca's *Teatro dei Sec. XIII., XIV., XV.* (1885).

Laudanum, or **TINCTURE OF OPIUM**, is an alcoholic extract, prepared by rubbing opium up with water, adding alcohol, and straining off the liquid portion. The weight of morphine in a given volume is next determined, and the solution diluted so as to contain .75 gram per 100 cc. Laudanum is a brown-coloured liquid, which is valuable medicinally on account of the morphine present. See MORPHINE and OPIUM.

Lauder, roy. bur., Berwickshire, Scotland, on the Leader, 23 m. S.E. of Edinburgh. A light railway connects it with Fountainhall, N.B.R. Lauder Bridge was the scene of the execution of the favourites of James III. of Scotland by Archibald Douglas ('Bell-the-Cat') and the nobles (1433). Pop. (1901) 724.

Lauder, ROBERT SCOTT (1803-69), Scottish portrait painter, was born near Edinburgh; studied in London and Italy, and returned to Edinburgh in 1849. His best-known works are *Christ Teacheth Humility* and *Trial of Effie Deans*. Examples of his work are in the Scottish National Gallery.

Lauder, SIR THOMAS DICK (1784-1848), Scottish author, was born at Fountainhall, Haddingtonshire. Endowed with most versatile talents, he was alike eminent in many fields. Among his publications, all connected with Scottish subjects, are his classic paper, *The Parallel Roads of Glenroy* (1818); *Account of the Great Moray Floods of 1829* (1830); 'Scottish Rivers,' in *Tail's Mag.* (1847-9); *Tour Round the Coast of Scotland* (1842); and his romance, *The Wolf of Badenoch* (1827).

Lauder, WILLIAM (c. 1680-1771), Scottish literary forger, was the author of *Poetarum Scriptorum Musae Sacrae* (1739) and other compilations, and reiterated *ad nauseam* the supposed superiority over George Buchanan of Arthur Johnston, the Scottish writer of sacred poems and of Latin verse. He also attacked the literary and poetical status and good faith of Milton, and issued garbled extracts from Masenius and Staphoristius, which he asserted Milton had plagiarized in *Paradise Lost*. He was exposed by Douglas, afterwards bishop of Salisbury.

Lauderdale, JOHN MAITLAND, FIRST DUKE OF (1616-82), born at Lethington, Haddingtonshire, eldest surviving son of the first Earl of Lauderdale. At first a zealous Covenanter, he was appointed one of the commissioners of the General Assembly of the Church of Scotland to the Assembly of Divines at Westminster (1643). After the surrender of the king to the English he became a strenuous loyalist, and was one of the chief promoters of the 'engagement' for his rescue. He was one of those sent by the Committee of the Estates to invite Charles II. to return to Scotland, and accompanied him thither in 1650. Taken prisoner at the battle of Worcester (1651), he was not released until Monk's entry into London (1660). Later he went to Breda, where he entered into communication with Charles II., over whom he gained a remarkable influence, and by whom, on the restoration, he was made secretary of state for Scotland. The unflinching severity of his administration against the covenanting conventicles earned him the almost unexampled hatred of the Scottish people. Created Duke of Lauderdale and Marquis of March (1672), he was two years later made an English peer by the title Earl of Guildford and Baron Petersham. After the visit of the Duke of York to Scotland (1680) his influence declined, and in October of that year he resigned. See *Lauderdale Papers*, published by the Camden Society (3 vols. 1884-5).

Laudon, or **LOUDON**, **GIDEON ERNST**, **FREIHERR VON** (1717-90), Austrian field-marshal, born at Tootzen, Livonia, was for ten years in the Russian service, but exchanged into that of Austria (1742). He displayed great talent during the Seven Years' war, the victories of Hochkirch, Kunersdorf, Landeshut, and Glatz being mainly due to his ability. Laudon again commanded during the war of the Bavarian Succession (1778), and in the Turkish war (1788-9), when he captured Belgrade. See *Janko's Das Leben G. E. Laudons* (1869), and *Malleon's Life of Laudon* (1884).

Lauds. See **BREVIARY**.

Lauburg. See **BREVIARY**.
Laubenbourg. (1.) Circle, prov. Schleswig-Holstein, Prussia, with area of 453 sq. m., and pop. (1900) 51,833. Well forested, with many lakes; agriculture and cattle-raising are the chief industries. Chief tn. Ratzeburg. (2.) Town on the Elbe, 25 m. S.E. of Hamburg; former capital of the duchy. Pop. (1900) 5,346. (3.) Town, prov. Pomerania, Prussia, on the Leba, 38 m. W.N.W. of Danzig. Manufactures woollen, linen, leather, machinery, and matches. Pop. (1900) 10,436.

Laughing Gas. See **NITROGEN**.



Laughing Jackass.

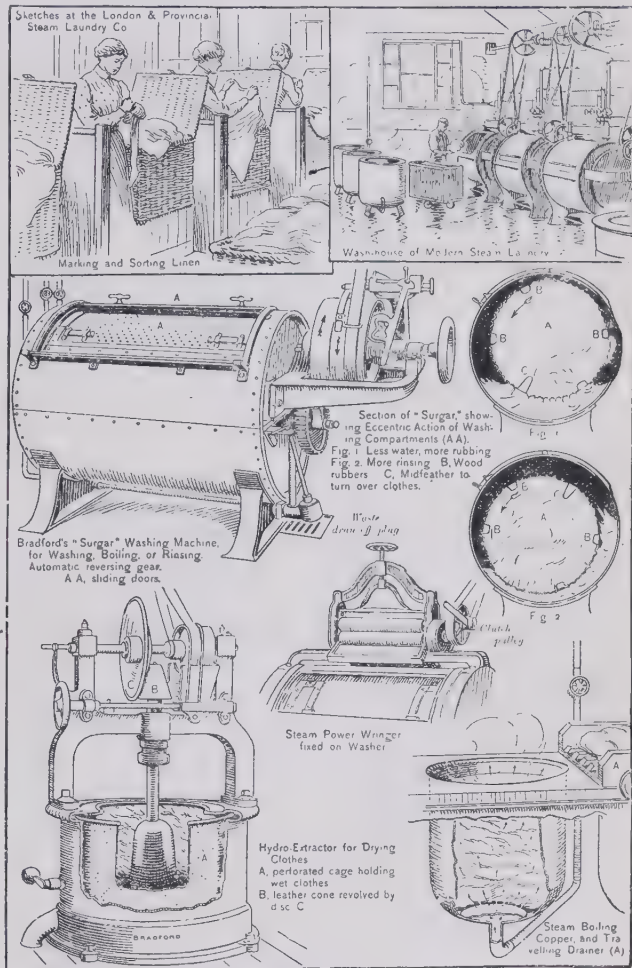
Laughing Jackass, or **SETTLER'S CLOCK** (*Dacelo gigas*), a very large kingfisher found in Australia, where it receives its popular names from the peculiar gurgling cry uttered with great regularity at dawn and dusk. It is one of the wood kingfishers, the food consisting of reptiles, birds, insects, and even small mammals. The name is also applied to other species of the same genus found in Australia and New Guinea, and possessing similar habits. The colouring is not brilliant, consisting of a mixture of brown, black, and white, but the male has the lower part of the back of a greenish-blue colour. See **KINGFISHER**.

Laughton, **JOHN KNOX** (1830), English nautical writer, born at Liverpool; became secretary of the Navy Records Society. In 1885 he was elected professor of modern history, King's College, London. His works include *A*

Treatise on Nautical Surveying (1872); *Nelson* (1895); *Memoirs of Henry Reeve* (1898); *From Howard to Nelson* (1899); *Nelson and his Companions in Arms* (1905).

Laun, tn., Bohemia, Austria, at the S. foot of the Erzgebirge, 35 m. N.W. of Prague, on the riv. Eger. Produces sugar, beer, and flour. Pop. (1900) 10,212.

and royalists. Pop. (1901) 4,053. (2.) Principal town of the north of Tasmania, Commonwealth of Australia, situated at the confluence of the North and South Esk rivers. There is communication by steamer with Melbourne and Sydney, and by railway with Hobart (120 m.), Ringarooma (47 m.), and Ulverstone (99 m.). The town is pleasantly situated



Modern Laundry Apparatus.—I.

Launce. See **SAND-LAUNCE**.
Launceston. (1.) Munic. bor., Cornwall, England, 24 m. N.W. of Plymouth. Has ruins of a castle, one of the old town gateways, the churches of St. Mary Magdalene and St. Stephen, and remains of a priory. During the civil war Launceston was alternately held by parliamentarians

in a valley surrounded by lofty hills. It is the commercial, official, and judicial capital of the north, and its commerce is larger than that of Hobart. Pop. (1901) 21,046; with suburbs, 26,430.

Laundries, **MODERN STEAM**. Mechanical contrivances to save labour and secure greater efficiency in the process of washing

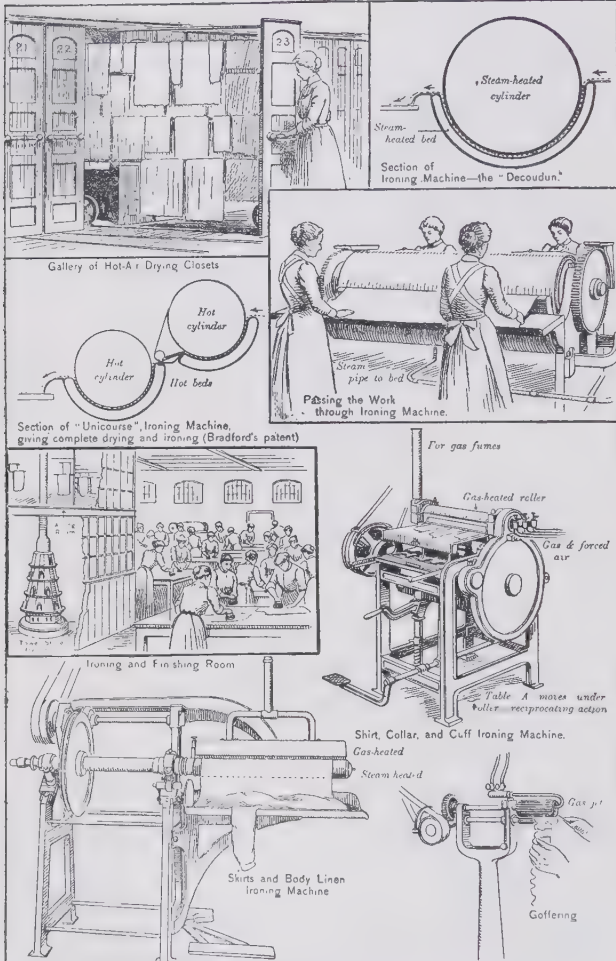
are very ancient, the washing slab, whether of plain or corrugated wood or of stone, and the wooden mallet-beater or other scrubbing implement, being found in all countries. A modification of this is the dolly, which, in its most simple form, is a wooden rod having a series of spokes at its lower end and a cross-bar

by means of cog-wheels set in motion by a hand-wheel. Another mechanical improvement is represented by the automatic steam-flow washing machine, which consists of a metal receptacle, provided with a false bottom, to which a metal coiled tube is fixed, both being pierced. Clothes are packed loosely round the contrivance,

mechanical friction and chemical solvents (steam and alkalis). The next stage was to combine the action of steam and rotary beaters, and this has resulted in the introduction of a large variety of steam washing machines.

There are three principal types, viz.:—(1.) *The tub and dolly*. In this the tub is made steam-tight, the dolly is rotated by steam power, and steam is conveyed into the tub in order to heat (or boil) the water. (2.) *The treading machine*, consisting of a trough, over which is a horizontal beam supporting a number of vertical stampers, which are raised and depressed alternately by means of steam power. This machine imitates the process of foot treading. (3.) *Rotary washers*. The best type of rotary consists of an outer cylinder of wood or metal, inside which a cage (composed of metal bars or perforated sheets of metal or staves of wood) is hung either on special bearings or on a spindle running right through the machine. The machine being packed with clothes (about one-fourth full), cold and hot water are run in, and soap, melted to a jelly, is added. The doors are then closed, and the machine is set in motion. At the same time steam is admitted, and in this way the water may be brought to the boiling-point. Meanwhile the machine revolves at a great rate, first from right to left, and then from left to right. The linen is subjected to a complication of actions. There is the soaking in alkaline water; the rubbing against the inner cage; the linen, being raised, is thrown down on the water below, and subjected to rain of soap-suds; meanwhile the steam forces itself and the soap-suds through and through the linen. In some machines the cage, by means of eccentric gearing, is given a rocking as well as a rotatory motion. There are also endless varieties in the construction of the cages.

While washing machines were being improved, equal attention was being bestowed on ironing appliances. The box mangle suggested the large ironers with metal beds and revolving rollers. In the Decoudun type there is a polished steel concave bed or chamber, heated by steam or gas, and blanket-covered roller. The linen is dragged through by means of the flannel-covered roller, and is polished on the heated bed. In other cases there are a number of rollers revolving in a set of grooves in the steam-heated bed. Many of these machines are ten or twelve feet in length. Smaller machines are made for ironing collars and small articles, and some are ingeniously contrived so as to iron shirts and skirts.



Modern Laundry Apparatus.—II.

handle at the upper one. Such a dolly is used to beat and rub clothes when placed in soap-suds in a tub, the implement being revolved by hand. This dolly ultimately was fixed in the tub, the lower end shod with a metal point fitting into a groove, while the head was fixed to a horizontal beam supported by uprights, and the dolly was made to revolve

soapy water is added, and the receptacle placed over the fire. As soon as the lower strata of water becomes heated it rises, and gradually steam is evolved, escaping upwards through the perforated coil. In this way a constant and violent circulation of the hot and soapy water is kept up, and the linen is subjected to the dual action of

Body and table linen is usually placed immediately into the washing machines, into which water is run together with jellified soap (to which sometimes a little borax or paraffin may be added). The machines are set in motion and steam admitted. Having run sufficiently long, the soap-suds are drained off, hot water admitted while the machine is running, and gradually cold water is run in. This is the process of rinsing. Usually the last rinsing water is tinted by the addition of diluted indigo or ultramarine blue. The machines are then stopped, the doors opened, and the linen removed to the hydro extractors. These are rotary cages, like round baskets, into which linen is packed, the moisture being removed by centrifugal force as the cage revolves horizontally by means of a steam-driven belt. The hydro extractor is safer than a roller wringing machine. From the hydro extractors the linen is removed to the drying ground, or, if dispatch is necessary or the weather rainy, to drying closets, usually built like closets, with a series of horses fitting into them, and heated by waste steam or hot air. From the drying closet or grounds the linen is removed to the ironing room, where it is starched, and then passed on to the mangle, large Decoudun or similar machine, to the collar-ironing machines, and so on. Hand-ironing for collars and shirts is still very general even in large steam laundries.

Laura (Gr. 'lane,' 'passage,' 'alley'), one of the features in the primitive practice of monastic seclusion in the East. The ascetic mode of life, with its habits of solitude, more or less extreme, was associated with habitation in an assemblage of monastic cells or huts, which preserved the common life of communities, and were the prototype of the more complex monasteries themselves.

Laurahütte, comm., prov. Silesia, Prussia, 7 m. S.E. of Beuthen; has coal mines and iron, zinc, and cement works. Pop. (1900) 13,571.

Laurate. See POET LAUREATE.

Laurel, or sweet bay tree, a well-known evergreen shrub, belonging to the genus *Laurus*. It is characterized by its long, lanceolate, shiny leaves, and by a characteristic aroma yielded by all parts of the plant when crushed. In early spring it bears small yellowish flowers, and these are followed by dark purple berries in autumn.

Laurelia, a genus of trees belonging to the order Monimiacæ. One species, *L. Novæ-Zelandiæ*, is a native of New Zea-

land, and reaches a height of 150 ft. The only other species is a native of Chile. Both have aromatic leaves, resembling bay leaves in scent.

Laurence. See LAWRENCE.

Laurence, SAMUEL (1812-84), English portrait painter, was born at Guildford, Surrey. He first exhibited at the Royal Academy in 1836. Among his portraits are those of Tennyson, Dickens, Carlyle, Browning, Lowell, Mrs. Somerville, Spottiswoode, Sedgwick, and other distinguished men. The National Portrait Gallery, Trinity College, Cambridge, and the Reform Club contain examples of his art.

Laurent, AUGUSTE (1807-53), French chemist, was born near Langres, and studied under Dumas, afterwards becoming professor of chemistry at Bordeaux and warden of the mint in Paris. He worked almost exclusively at organic chemistry, in particular on phenol and naphthalene, and is chiefly notable for his work in conjunction with Gerhardt in grafting the theory of 'radicals' on to that of 'types,' and thus leading to a clearer understanding of the constitution of organic compounds.

Laurentia, a genus of half-hardy, herbaceous plants, belonging to the order Campanulaceæ. They are small plants of fragile habit. The chief species is *L. erinoides*, a S. African native, bearing purple and yellow flowers in late summer.

Laurentian System. See ARCHEAN SYSTEM.

Laurentum, anc. cap. of Latium, Italy, near the coast, 16 m. S.W. of Rome, and near the modern Tor Paterno. Its name is said to be derived from the surrounding laurel groves, which formed an attraction for wealthy Romans. Under Trajan, Laurentum and the neighbouring town of Lavinium were recolonized and united under the name of Lauro-Lavinium.

Lauria, city, Potenza prov., Basilicata, Italy, 42 m. S.E. of Potenza; manufactures woollens, linen, and leather. Pop. (1901) 10,099.

Laurier, SIR WILFRID (1841), Canadian statesman, was born at St. Lin, Quebec, and educated at L'Assomption College and at McGill University. He studied law, and was called to the bar in 1864. He turned early to politics, entering first the Quebec Legislature in 1871, and the Dominion House of Commons in 1874. His splendid gift of oratory gave him an immediate position in federal politics, and he had the gift and the distinction of speaking equally well in both French and English. He entered the Liberal Mackenzie ministry in 1877, but at the en-

suing general election in 1878 was defeated. He was, however, returned for the city of Quebec, which has remained faithful to him, giving him at each election increasing majorities. In 1891 he was elected leader of the Liberal party. In 1896 he became prime minister, the first French-Canadian to hold that position. His tenure of that office was marked at the start by the inauguration of preferential tariff in 1897; and his policy, while assisting to develop the resources of Canada, and to promote its peace and prosperity, has had a marked imperialist tendency. His government was sustained at the general election in 1900, and again in 1904.

Laurinacæ, a natural order of herbs, shrubs, and trees, mostly tropical in habitat, and mostly possessing marked aromatic properties. They bear evergreen, coriaceous leaves and small greenish flowers. Among the genera are *Laurus*, *Cinnamomum*, *Camphora*, and *Sassafras*.

Lauriston, JACQUES ALEXANDRE BERNARD LAW, MARQUIS DE (1768-1828), French general, born at Pondichery; was the contemporary of Napoleon, was associated with him in his military operations, and commanded the rearguard in the retreat from Moscow. After the second restoration he tendered his allegiance to Louis XVIII., and received an army appointment, eventually becoming a marshal of France (1821).

Laurium (Gr. *Lauræion*). (1.) Mountain at the extreme S. end of Attica, in ancient Greece. It was famous for its silver mines, which, however, became exhausted before the Christian era; but since 1873 mining (lead, cadmium, and manganese) has begun again in the district. The mines are connected by rail with Athens through the port of Laurion or Ergosteria, where there are smelting furnaces. Pop. 7,000. See Bursian's *Geographie d. Griech.-land*. For the mines, see Ardaillon's *Les Mines du Laurion dans l'Antiquité* (1897). (2.) Tn., Houghton co., Michigan, U.S.A., on Mineral Range and the Copper Range Rys., 42 m. N. of L'Anse; contains one of the richest copper mines (Calumet and Hecla) in the world, yielding from 10,000 to 20,000 tons annually. Pop. (1900) 5,643.

Laurustinus (*Viburnum Tinus*), is an evergreen shrub belonging to the order Caprifoliaceæ. It is a native of S. Europe, but is very hardy in almost any soil and situation. It bears entire ovate leaves, and, through the winter months, flat corymbs of white flowers, slightly tinged with pink. The fruit is a

dark-blue drupe. Several varieties are cultivated, including *V. T. lucidum*, with larger flowers than the type; *V. T. strictum*; and *V. T. hirtum*, with leaves hairy beneath.

Laurvik, or **LARVIK**, tn. and bathing-place, Jarlsberg-Laurvik prov., Norway, on the fiord of the same name, and on the Drammen-Skien Ry. Industries include shipbuilding and glass-works. Exports timber, ice, wood-pulp, and granite. Pop. (1901) 10,664.

Lausanne, tn., cap. of Canton Vaud, Switzerland, built on the slopes of the Jorat range, and on the N. shore of the Lake of

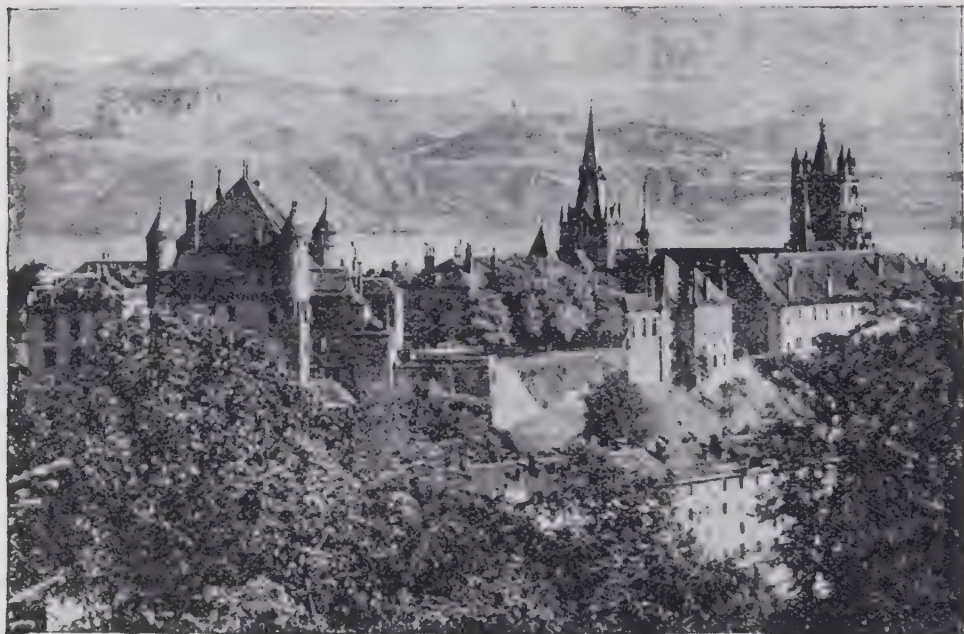
Lava. The molten rock which exists within or beneath active volcanoes is often forced up to the surface during an eruption, and may be seen within the crater. The temperature of lava probably ranges from 1200° to 2000° c., and in some cases its liquidity is so great that the molten rock forms a fountain rising in the air. Lava streams on the Sandwich Islands have flowed for over forty miles, and the greatest known discharge of the kind is that which accompanied the eruption of Skaptar Jokul, in Iceland, in 1798, one branch of which flowed for a distance of over fifty miles. Ac-

ufactures 'tickings,' cotton goods, paper, leather, and machinery. Has marble quarries. Pop. (1901) 30,356.

La Valetta. See VALETTA.

La Vallière, FRANÇOISE LOUISE DE LABAUME LE BLANC, DUCHESSE DE (1644-1710), mistress of Louis XIV., born at Tours, of old and honourable descent. The advent of Madame de Montespan caused her to retire to a Carmelite convent, where she died. She wrote *Réflexions sur la Miséricorde de Dieu par une Dame pénitente* (1680). See *Lives* by Houssaye (1860) and Duclos (1890).

Laval-Montmorency, FRANÇOIS XAVIER DE (1622-1708),



Lausanne: the Castle and the Cathedral, looking towards the Lake.

Geneva: the seat of the federal court of justice. Its cathedral church is perhaps the finest mediæval building in Switzerland. It is the resort of many English, by reason of its excellent educational institutions. Manufactures machinery, tobacco, and chocolate, and has large vineyards. Pop. (1900) 47,444.

Lausitz. See LUSATIA.

Lauterbrunnen, tourist resort in the Bernese Oberland, Switzerland, six and a half miles S.E. of Interlaken, in the deep and picturesque valley of the White Lutschine. A mountain railway connects it with Grindelwald by the Wengernalp, and a funicular and electric railway ascends to Mürren.

cording to their chemical composition, and the minerals which crystallize out of the lavas when they cool, they have been subdivided into many classes, such as rhyolites, trachytes, phonolites, andesites, basalts, tephrites; but for a description of these the reader is referred to works on petrology, such as Hatch's (1892), Harker's (1897), and Teall's (1888).

Lavagna, seapt. in Genoa prov., Italy, 43 m. E.S.E. of Genoa; has slate and marble quarries. Pop. 7,000.

Laval, cap. of the dep. Mayenne, France, on the Mayenne, 187 m. W.S.W. of Paris; has a 12th century Gothic cathedral and an ancient ducal chateau. Manu-

French-Canadian pioneer, was born at Laval, France. In 1659 he was sent to Canada as vicar of the Pope, where in 1663 he established the Seminary of Quebec. From 1674 to 1683 he was titular bishop of Quebec. He afterwards resigned, and devoted himself to the advancement of the seminary.

Laval University, a French Catholic university established in 1852 at Quebec, Canada, and maintained by the Quebec Seminary. There are faculties of theology, law, medicine, and arts, and the usual bachelor's, master's and doctor's degrees are conferred. The students number about 400, and there is a library of 140,000 volumes. In 1876, by Papal bull,

the university received an extended constitution. It is under the control of a council composed of the archbishop and bishops of the province of Quebec. Its extension work is carried on by affiliated seminaries throughout the province, and through a branch at Montreal.

Lavater, JOHANN KASPAR (1741-1801), Protestant minister and writer on physiognomy, was born at Zürich. Ordained in 1762, he subsequently became minister of the church of St. Peter. Having published a collection of Swiss songs (1767), he was next engaged on a treatise

Lavatera, a genus of herbaceous and shrubby plants belonging to the order Malvaceæ. The principal species with horticultural interest are the annual *L. trimestris*, with rosy flowers, and its variety *alba*; the biennial shrub *L. arborea*, with downy leaves and pale purplish flowers; and *L. olbia*, the tree lavatera, a perennial shrub with hairy leaves and solitary, short-stalked red flowers.

Lavaur, tn., dep. Tarn, France, on the Agout, 20 m. E.N.E. of Toulouse; has a 14th-century cathedral, and manufactures silk. Pop. 5,000.

Lavender, a hardy perennial herb, *Lavandula vera*, valued for its fragrant flowers, which retain their scent for a long period if carefully gathered and dried. It has ever-gray leaves, narrow and entire, and in summer bears interrupted spikes of bluish labiate flowers arranged in whorls. It is a native of Southern Europe. Lavender is of easy cultivation in any light, well-drained soil—propagation being most readily effected by means of cuttings, or by rooted slips obtained by division of the old roots. Lavender water may be made, without distillation, by mixing to-



Lava Flow on Mount Vesuvius.

entitled *Aussichte in die Ewigkeit* (1768-78). Afterwards he devoted himself to physiognomy, which he endeavoured to make scientific by means of his famous work on the subject, *Physiognomische Fragmente zur Beförderung der Menschenkenntniss und Menschenliebe* (1775-8). His speculations procured him the friendship of Goethe, Herder, Wieland, Jacobi, Sailer, and Oberlin, with whom he was in constant correspondence. See *Lives* by Bodemann (1877), Muncker (1883), and Hofhaus (1888).

Laveleye, EMILE LOUIS VICTOR, BARON DE (1822-92), political economist, was born at Bruges, and became professor of political economy at Liège in 1864. He contributed many articles to the *Nineteenth Century*, *Revue des Deux Mondes*, and other periodicals, and was the author of *De la Propriété et de ses Formes Primitives* (4th ed. 1891; Eng. trans. 1878), *Eléments d'Economie Politique* (4th ed. 1893), and *Les Lois Naturelles et l'Objet de l'Economie Politique* (1883). See *Life* by Goblet d'Alviellas (1895).

gether a pint of rectified spirit, four ounces of distilled water, three drachms of oil of lavender, three drachms of orange-flower water, five minims each of oil of cloves and oil of cinnamon, and four minims of otto of roses. Allow this mixture to stand for a fortnight, then filter through magnesium carbonate, and bottle. It should be kept for at least three months before using. The chief counties in England in which lavender is grown on a large scale are Surrey and Hertfordshire.

Lavender Cotton, a beautiful little herbaceous plant, *Santolina Chamæcyparissus*, with very quaint, finely-cut gray leaves, and yellow flower-heads in late summer.



Lavender.

1, Flower, side view; 2, front view;
3, corolla, opened.

Laver, a brazen vessel in the Hebrew tabernacle, in which the priests cleansed their hands and feet in preparation for the sacrifices. It stood upon a pedestal, also of brass, and was placed in the court between the altar of burnt offering and the tabernacle proper. See **TABERNACLE**.

Laver, a name given to various seaweeds belonging to the genera *Ulva* and *Porphyra*, occurring on certain parts of our coasts. It is frequently used as an article of food after being well boiled.

Lavery, JOHN (1857), Scottish portrait painter of the Glasgow school, born at Belfast; studied in Paris from 1881, and in 1883 his *Two Fishers* was hung in the New Salon. His *Tennis Party* (Munich Pinakotek) was exhibited in the Royal Academy in 1887, while *The Visit of Queen Victoria to the Glasgow Exhibition* (1888) is in the Glasgow Gallery. Other notable pictures are *Mother and Son*, *White Feathers*, *A Lady in Black*, and many portraits.

La Villemarqué, THÉODORE CLAUDE HENRI HERSART, VICOMTE DE (1815-95), Celtic archaeologist and philologist, born at Quimperlé, and studied at Paris. A prolific writer on Breton poetry, history, and literature, his *Barzas-Breiz* (1839; Eng. trans. 1865) was the outcome of long-continued research. He was also editor of the *Dictionnaire Français-Breton* (1857); and wrote *Contes Populaires des Anciens Bretons* (1842), *Poèmes des Bardes Bretons* (1850), and *Poèmes Bretons du Moyen-Age* (1897).

Lavinia, in Roman legend, the daughter of Latinus and Amata, and wife of Æneas. See *Virgil's Aeneid*.

Lavinium, anc. tr. of Latium, Italy, on the Appian Way, 15 m. S.E. of Rome, and near Laurentum, with which it was joined by the Emperor Trajan to form Lauro-Lavinium. The site is occupied by the modern Pratica.

Lavisse, ERNEST (1842), French historian, born at Nouvion-en-Thiérache. After some years of teaching in lycées, he became professor of modern history at the Sorbonne (1888), and a member of the Academy (1892). His chief works are on the history of Germany—*Études sur l'Histoire de Prusse* (1879), *Essais sur l'Allemagne Impériale* (1887), *La Jeunesse du Grand Frédéric* (1891), *Trois Empereurs d'Allemagne* (1888), and is at present engaged on a *Histoire de France*.

Lavoisier, ANTOINE LAURENT (1743-94), French chemist, was born in Paris, and studied chemistry under Rouelle. He early devoted his attention to research, and was elected at the age of twenty-five a member of the Académie des Sciences. His principal work was in developing the true explanation of the phenomena of calcination and burning, and he formulated the theory of the conservation of mass upon which all modern chemistry rests. He also had a great part in devising the basis of the present system of chemical nomenclature. Unfortunately, in his position of *fermier-général*, he fell under suspicion during the reign of terror, and perished by the guillotine when at the height of his intellectual activity. His most important works are *Traité Élémentaire de Chimie* (1789) and *Mémoires de Chimie* (1805). His complete works were published by the French government (1864-93). See his *Life* by Grimaux (1888), and Thorpe's *Essays in Historical Chemistry* (1894).

Lavos, tn. in Coimbra dist., Beira, Portugal, on the s. side of the estuary of the Mondego, 23 m. W.S.W. of Coimbra; was the landing-place of British forces during the Peninsular war. Pop. (1900) 7,967.

Lavradia, a genus of Brazilian shrubs belonging to the order Violariaceæ. The only species commonly grown in this country is *L. montana*, a stove plant, about three feet in height, which bears crowded terminal racemose panicles of rose-coloured flowers.

Law. See **JURISPRUDENCE**.

Law (scientific). By a 'law' in the natural and social sciences is meant a generalized statement regarding the connection of phenomena by way of coexistence

or sequence. The more thoroughly and exactly the conditions of any such uniformity of sequence or coexistence are ascertained, the more certain and scientific does the generalization or law become; while, so far as the uniformity is merely affirmed as a fact of experience without its conditions being determined, the generalization—termed in that case an 'empirical law'—is of inferior scientific value. With the progress of science, a belief in the universality of law has been more and more impressed upon modern thought; but with the wider diffusion and popularization of the scientific mode of thought, there have been associated popular misconceptions of the nature and meaning of a law. One of these is the notion of laws, or at least the way of speaking about laws, as if they were actual existences or forces in themselves. In the case of social (e.g. economic) laws the error is serious, because the modes of action described in economic laws are not the invariable operations of nature, but the activities of man, which are capable of being modified by the forces of legal enactment and opinion. For the logical problems involved, see *MILL'S Logic*, bk. iii. See also the Duke of Argyll's *Reign of Law* (19th ed. 1890).

Law, EDWARD. See **ELLENBOROUGH**, BARON.

Law, JOHN, 'of Lauriston' (1671-1729), originator of the Mississippi Scheme, was born at Edinburgh. Over a duel in which he killed his opponent Law fled to the Continent, and finally settled in Paris. Here he began a private bank (1716), and in 1718 induced the Regent Orleans to adopt his suggestion for a national bank. His scheme for settling lands in the Mississippi valley was started in 1719; a company was formed, and the wild speculations in its stock brought widespread ruin and disaster when the bubble burst. Law died in poverty at Venice. See **MISSISSIPPI SCHEME**, and *Life* by Wood (1824).

Law, THOMAS GRAVES (1838-1904), Scottish historian, was educated at Stoneyhurst after his father's conversion to Romanism. Under the influence of Faber and Newman he joined the Oratorians, but severed his connection with the Church of Rome in 1878. Shortly after, he was appointed librarian of the Signet Library in Edinburgh, where he also became secretary of the Scottish History Society. In addition to editing the forty-four volumes of the publications of the society, he also wrote many valuable essays. See his *Collected Essays and Reviews* (1904).

Law, WILLIAM (1686-1761), English mystic, nonjuring divine, and controversialist, was born at King's Cliffe, Northamptonshire. He entered Emmanuel College, Cambridge, as a sizar, in 1705; gained a fellowship in 1711, and in the following year took orders. He continued at Cambridge, teaching and occasionally preaching, till the accession of George I. in 1714, when, in accordance with his strong Jacobite leanings, he conscientiously refused to take the oath of allegiance, and at once lost his fellowship and all chance of ecclesiastical preferment. About 1727 he became private tutor to Edward Gibbon, the historian's father, proceeding with his pupil to Cambridge, where he stayed for about four years, and thereafter returned to Putney, to act as the esteemed confidential adviser of the Gibbon family, and as the spiritual guide of a group of young men, including the Wesleys and Byron, the poet. These pleasant conditions were disturbed by the death of his patron in 1737, and in 1740 Law returned to King's Cliffe, where he had a small inheritance. Here he was joined by Mrs. Hutcheson, the widow of an early friend, and Hester Gibbon, aunt of the historian, both ladies possessing private means; and the three gave themselves to religious exercises and works of charity. Law's character is well summed up by Gibbon, who speaks of him as one who 'believed all that he professed, and practised all that he enjoined;' and his literary activity, extending from 1717, the date of his *Three Letters to the Bishop of Bangor* (Hoadley), till the year of his death, places him among religious classic writers. His controversial works include *Remarks on a late Book entitled 'The Fable of the Bees'* (1724), and *The Case of Reason* (1732), in which he deals most effectively with Mandeville and Tyndall respectively; but his most outstanding works are his *Practical Treatise on Christian Perfection* (1726), and *A Serious Call to a Devout and Holy Life* (1729). His first acquaintance with the writings of Jakob Boehme, about 1834, marks an era in his spiritual and literary history; from that time he stood under the influence of mysticism, and issued many works—e.g., *The Spirit of Prayer* (1749) and *The Spirit of Love* (1752), which rank high in the literature of that school. See his *Collected Works* (9 vols. 1762), privately reprinted, with 'Memoir' by G. B. Moreton, 1892; *Overton's William Law, Nonjuror and Mystic* (1881); and Whyte's *Characters and Characteristics of William Law* (1893).

Law, WILLIAM ARTHUR (1844), English dramatist, born near Cromer; went on the stage (1872), being one of German Reed's company, and later acted at the Savoy. Law has produced some forty light comedies; amongst others, *A Night Surprise* (1877), *A Mint of Money* (1884), *John Smith* (1889), *All Abroad* (1890), *A Country Mouse* (1902), *The Bride and Bridegroom*, and *The Rising Sun* (1904).

Law Agent. The Law Agents (Scotland) Act, 1873, defines a law agent as soliciting writers to the signet, solicitors in the supreme courts, procurators in any sheriff court, and every person entitled to practise as an agent in a court of law in Scotland. The act abolishes all special privileges of practising in particular courts. See also **SOLICITORS**.

Lawburrows, an old form of Scots process for compelling a man to find caution that he will not do harm to the person or property of the complainer, his family, servants, or tenants.

Law Courts. See **ROYAL COURTS OF JUSTICE**, and separate articles on the different courts of law—e.g. **SUPREME COURT**, **COURT OF SESSION**, **COUNTY COURTS**, and **SHERIFFS' COURTS**.

Lawes, SIR JOHN BENNET (1814-1900), English agriculturist, born near St. Albans. After studying chemistry, he started systematic experiments at Rothamsted (1834), particularly on the effect of bones as a manure. In 1843 he began at Deptford the manufacture of superphosphate for manure. He was created a baronet (1882). The results of his experiments are recorded in various scientific journals, especially those of the Royal Agricultural and Royal Societies. See Hall's *The Book of the Rothamsted Experiments* (1905).

Lawfield, or **LAVELD**, vil., Limburg prov., Belgium, 4 m. from Maastricht; here the allies under the Duke of Cumberland were defeated by the French in 1747.

Law-merchant. The law-merchant is now scarcely distinguishable from the common law, and differs from it historically only in the fact that at one time it affected merchants alone, and that it is derived to a great extent from international usage. It was manufactured in the ports and markets of Europe, and consists of the customs connected with business and business documents, which have grown up for the convenience of mercantile transactions. A good example is the law of negotiable instruments. In some important cases it has become part of the statute law, as in the Bills of Exchange and Sale of Goods Acts.

Lawn. See **LINEN**.

Lawns (GRASS) require great care in their preparation and maintenance. The soil should be of moderate lightness, dug a spade deep, thoroughly drained, and carefully levelled. If good turf, free from weeds, is obtainable, it may then be laid down in blocks of uniform size and thickness. If seeds are to be used, the soil is trodden, and the seeds are carefully and uniformly sown at the rate of about 60 lbs. per acre, the whole being gently raked after the sowing. When the grass is well up the lawn should be rolled. Regular rolling, mowing, sweeping, and watering in summer are necessary.

Lawn Tennis. Lawn tennis is a game played by from two to four persons, who hit a ball with rackets to and fro over a net stretched across the centre of a court marked on the ground with lines. The game in its present form was practically first introduced into England in 1877, and became popular. In 1887 the Lawn Tennis Association was founded, and has since governed the affairs of the game. Grass courts are to be found everywhere, and the finest covered courts are those of the Queen's, Hyde Park, and Wimbledon Clubs, the floors of which are respectively wood blocks, boards, and asphalt. The rackets used vary in size and weight, 14 oz. being about the medium weight. The balls are of inflated indiarubber covered with white cloth, from 2½ to 2¾ in. in diameter, and from 1½ to 2 oz. in weight.

The Play.—The single-handed game is played by two persons in a single court. (See diagram.) The winner of the toss has the option of serving first, or of selecting his side, or of giving his opponent first choice. The opponents place themselves on opposite sides of the net. In serving, the server must comply with the following rules:—(1.) He may stand anywhere behind the base-line; the toe must not be over the line, under the penalty of a 'foot-fault.' (2.) He must serve alternately from right and left courts, beginning from the right. (3.) The ball must cross the net and fall in the rectangle diametrically opposite the server which is bounded by the service-side and half-court lines, or on any of these bounding lines. It is a fault if any of the above rules are broken. Two faults count a stroke to the 'striker-out'—i.e. the server's opponent. If the service is not a fault, but the ball touches the net, it is a let, and the server serves again. Neither faults nor lets may be taken. The striker-out must take

the service first-bound; after that the ball may be volleyed (*i.e.* hit before it touches the ground) or taken first-bound. If a player fails to hit the ball before it touches the ground twice, hits it into the net, or so that it falls outside the bounding lines of the court, or before it reaches his side of the net, or hits it twice,

game. In the service the ball must drop in the rectangle bounded by the service, service-side, and half-court lines. If W and X are playing Y and Z, the order of service is WYXZ, WYXZ, etc. The service is returned alternately by the two partners who are strikers-out throughout each game; but when once the

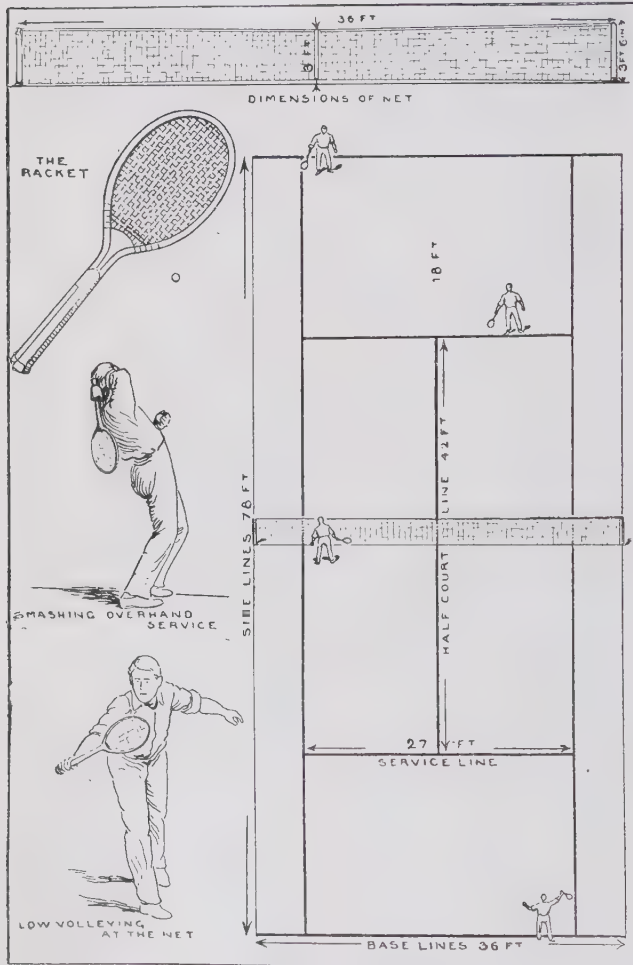
must win a certain number of strokes before they can start scoring. B, scratch players start with their scores at 0 in all games. C, the 'below-scratch' players are also divided into twelve classes, and start with certain scores in certain games.

The Method of Scoring.—On either player winning his first stroke the score is called 15 for that player, on winning his second stroke 30, and the fourth stroke is scored game, except as follows:—If both players have won 3 strokes, the score is called 'deuce,' and the next stroke won by either player is scored 'advantage' for that player. If the same player win the next stroke, he wins the game; if he lose the next stroke, it is again called deuce, and so on until either player wins the two strokes immediately following the score of deuce. The player who first wins six games wins a set.

Arranging Ties and Rounds in a Tournament.—The competitors' names are drawn from a bag or bowl, and written down in order on a list. When the number is 4, 8, 16, or any higher power of 2, they meet in pairs, the winners going into the second round. When the number of competitors is not a power of 2, the byes are placed in the first round, equally at the top and bottom of the list; if uneven in number, the greater number at the bottom. The number of byes equals the difference between the number of competitors and the next higher power of 2. See Wilberforce's *Lawn Tennis* (All-England Series, 1889), Heathcote's *Lawn Tennis* (Badminton Library, 1889), Brownlee's *Lawn Tennis* (1897), and Beldam and Vaile's *Great Lawn Tennis Players* (1905).

Law of Electric Lighting.

The Act of 1899 enacts that the provisions in the schedule shall be incorporated with every provisional order made by the Board of Trade. Under the Act of 1882 powers may be obtained by local authorities, or, with the consent of the local authority, by companies or private individuals—(1) By licence of the Board of Trade for not more than seven years; (2) by provisional order of the Board of Trade, and in this case the board may make a special report dispensing with the consent of the local authority; (3) by special Act of Parliament. The Board of Trade has large powers of control, including power to frame rules with regard to licences, and the existing rules provide that local authorities are to have preference over private contractors. By the Act of 1888, local authorities have power, within six months after the expiration of forty-two years after the confirm-



The Game of Lawn Tennis.

or is touched by the ball, or touches the net in making his stroke, his opponent wins a stroke. A ball falling on the line is reckoned to have fallen in the court. The method of scoring is the same as in tennis. (See TENNIS.) The four-handed game is played by two persons on each side in a double-court, in a manner similar to the single-handed

service has been returned, either partner may take the ball.

Handicapping.—For purposes of handicapping, players are split up into three main divisions, *viz.*: (A) Those above scratch form, (B) scratch players, (C) those below scratch form. A, the 'above-scratch' players, are divided into twelve classes, and start in certain games by 'owing' odds—*i.e.* they

atory or special act, or within six months after the expiration of any subsequent period of ten years, to purchase a private undertaking at its fair market value without any allowance for goodwill. See Michael and Will's *Law of Gas, Water, and Electric Lighting* (5th ed. 1901).

Law Officers. The law officers of the crown are the attorney-general and the solicitor-general of England and Ireland, and the lord advocate and the solicitor-general of Scotland.

Lawrence. (1.) City, Massachusetts, U.S.A., cap. Essex co., is situated in N.E. of the state, on the Merrimac R., 25 m. from Boston. Has magnificent water power for manufactures, the most important of which are cotton and woollen goods, and foundry and machine-shop products. Pop. (1900) 62,559. (2.) City, Kansas, U.S.A., cap. of Douglas co., situated in E. of the state, on the Kansas R. Manufactures flour, paper, machinery, and nails. The state university is situated here. Pop. (1900) 10,862. (3.) Township, 60 m. S. of Dunedin, New Zealand, the centre of a large gold-mining district. Pop. (1901) 1,159. See Vincent Pyke's *Hist. of Early Gold Discoveries in Otago* (1887).

Lawrence, SIR HENRY MONTGOMERY (1806-57), Anglo-Indian soldier and statesman, elder brother of Lord Lawrence, was born in Ceylon. He joined the Bengal Artillery (1823); fought in the Burmese war (1824-6), the Afghan war (1838), and the Sikh wars of 1845-9, besides holding important political posts at Lahore and at the court of Nepal. When the Punjab was annexed (1849), he was appointed first administrator. On the outbreak of the mutiny, Sir Henry's wise precautions saved the European inhabitants of Lucknow, enabling the Residency to withstand a four months' siege after the city was in the hands of the rebels. Here he was mortally wounded on the second day of the defence. See *Lives* by Edwardes and Merivale (1872), and Sir C. Aitchison (1892).

Lawrence, JOHN LAIRD MAIR, LORD (1811-79), who distinguished himself in the Indian mutiny, was born at Richmond, Yorkshire. He was sent to India (1829), and co-operated with his brother in the settlement of the Punjab, of which he was lieutenant-governor when the mutiny broke out. He instantly took the most vigorous measures, and through his influence with the Sikhs was able to raise a fresh army of 60,000 men to replace the mutinied regiments. He marched on Delhi, and after a three months' siege retook the city, winning the title of 'the

saviour of India.' He was granted a life pension of £2,000 a year, and created a baronet (1859). In 1863 he became governor-general of India. He was made a peer in 1869. See *Lives* by Smith (1883) and Sir R. Temple (1889).

Lawrence, STRINGER (1697-1775), English soldier, called 'the father of the Indian army,' born

Lawrence, SIR THOMAS (1769-1830), English portraitist, was born at Bristol. At the age of five he was famed for his recitations and for his crayon portraits. In Oxford many distinguished people were among his sitters; and his studio at Bath, before he was twelve, was frequented by beautiful women



A Portrait by Sir Thomas Lawrence—Elizabeth Farren, Countess of Derby.

at Hereford, and in 1748 was appointed to command all the East India Company's troops, at the moment when Dupleix was planning the conquest of S. India. With Clive, Lawrence carried out many successful operations, and contributed largely to the final frustration of French designs in India. See Biddulph's *Stringer Lawrence* (1901).

and men of rank and taste. He began to use oil colours at seventeen, and entered the Royal Academy schools (1787). His professional and social success in London was immediate. By the king's desire he was elected a supplemental A.R.A. (1791), and appointed his Majesty's painter (1792). When he received full academical honours (1795), he was

already without a rival in public estimation. Knighted by the prince regent (1815), three years later he went abroad on a commission to paint the allied sovereigns and principal continental personages in commemoration of the treaty of peace. On the death of West (1820) he was unanimously elected president of the Royal Academy. See Williams's *Life and Correspondence of Sir T. Lawrence* (1831), Cunningham's *Lives of the Most Eminent British Painters* (1829-33), Gower's *Sir T. Lawrence* (1900), Knepp's *An Artist's Love Story* (1904), and Ward's *English Art in the Public Galleries* (1888).

Lawrence, SIR WILLIAM (1783-1867), English surgeon, born at Cirencester, was apprenticed to Abernethy (1799), and became his demonstrator of anatomy at St. Bartholomew's Hospital (1801-13). In 1815 he became professor of anatomy and surgery at the College of Surgeons, and in 1824 surgeon to St. Bartholomew's. He published several valuable surgical and medical works. See *Memoir* by Savory (1868).

Lawrenceburg, chief tn. of Dearborn co., Indiana, U.S.A., on the r. bk. of the Ohio, 22 m. w. of Cincinnati; has flour mills, distilleries, and furniture works. Pop. 4,326.

Lawrence, St., river. See ST. LAWRENCE.

Lawrence, St. (d. 258), martyr, one of the deacons at Rome under Sixtus I. During the persecution of Valerian he was called upon to surrender the church treasures; but instead he produced the poor and sick under his charge, declaring that these 'were his treasures.' He suffered martyrdom by burning. His day is August 10.

Law Reports. In England the earliest reports of judicial decisions are contained in the year-books. Down to 1865 legal reporting in England was a matter of private speculation; and the different series, or single volumes, bearing the names of their authors, vary considerably in accuracy and authority. In 1863 a committee was appointed by the bar to consider the question of law reporting, and as the result of their report the Council of Law Reporting was established, under whose management and supervision the law reports have been published since 1866. In Ireland, India, and some of the colonies, the model of the law reports has to a great extent been adopted. For a full list of the English, Scottish, and Irish reports, with the abbreviations by which they are cited, see the beginning of the first volume of the *Encyclopedia of the Laws of England* (1897-1903); and for a

list of the colonial reports, see the article on 'Law Reports' in vol. vii. of the same work. In the United States official reporters are appointed for the Supreme Court, and in most of the state courts. A cheap republication of English and Scottish Law Reports from the earliest volumes is now appearing.

Lawson, CECIL GORDON (1851-82), English landscape painter, born in Shropshire. He did much of his best work in black and white for the *Graphic* and other journals, and in 1870 exhibited a view of Cheyne Walk at the Academy, and other works at the Grosvenor Gallery. Paintings by him are in the Manchester, Liverpool, and Tate Galleries. His principal works have been reproduced in a *Memoir* by E. W. Gosse (1883).

Lawson, SIR JOHN (d. 1665), English admiral, fought during the civil war in the Parliamentary army, and afterwards, like Blake and many others, in the fleet. In 1665, in the second Dutch war, he held command as vice-admiral of the 'Red squadron,' and took part in the battle off Lowestoft, where he was fatally wounded.

Lawson, SIR WILFRID (1829), English statesman and temperance advocate, entered the House of Commons as Liberal representative for Carlisle (1859-65 and 1868-85), for Cockermouth (1886-1900), and for Camborne Division, Cornwall, since 1903. In March 1864 he first brought in his Permissive Bill, 'to enable owners and occupiers of property in certain districts to prevent the sale of intoxicating liquors within such districts.' This cost him his seat. In 1880 he carried his Local Option resolution by a majority of twenty-six. The resolution was also passed in each of the two succeeding years. Sir Wilfrid is considered 'the licensed wit' of the House of Commons, and published in conjunction with Mr. F. C. Gould a book entitled *Cartoons in Rhyme and Line* (1904).

Lawsonia, a genus belonging to the order Lythraceae, containing only one species, *L. alba*, the henna plant. This is a tropical shrub, from whose fragrant white flowers is prepared the alhenna used in Arabia and Egypt for whitening the nails.

Law Terms. See TERMS.

Lawyer, the popular name of all members of the legal profession. In England and Ireland there are only two branches of the profession—*viz.* barristers and solicitors. In Scotland the main division is into advocates and law agents, but the latter have different names and privileges according to the society

to which they belong, such as writers to the signet, solicitors in the supreme courts, advocates in Aberdeen, and procurators in Glasgow. In the United States and in many of the British colonies the two branches of the profession are not distinct, and attorneys-at-law act both as counsel and as solicitors.

Laxenburg, imperial Austrian castle and park (1,000 ac.), 10 m. s. of Vienna. The former dates from 1377.

Laxmannia, a genus of Australian fibrous-rooted, liliaceous plants, some of the species being cultivated as greenhouse plants in this country. *L. gracilis* and *L. grandiflora* are the favourite species.

Layamon (fl. 1200), author of *Brut*, a poetical paraphrase of Wace's chronicle, *Brut d'Angleterre* (1155), with additions of his own. Layamon's *Brut* exists in two MSS., both in the British Museum. These were edited, with translation, by Sir Frederick Madden (1847). All that is known of Layamon's life is told by himself: 'There was a priest in the land, Layamon hight; he was Leovenath's son. He dwelt at Ernley' (Areley Regis in Worcestershire), 'at a noble church upon the Severn's bank.' See Marsh's *Origin of English Language* (1865).

Layard, SIR AUSTEN HENRY (1817-94), English traveller and archaeologist, born in Paris; was destined for the bar, but in 1839 started on a series of travels in the East. Being on the Tigris (1840), he was impressed by the ruin-mounds of Nimrud, at Nineveh, and he began excavations (1845). In that and in the two following years he made many discoveries, finding traces of four distinct palaces, and unearthing the colossal human-headed bulls now in the British Museum, and numerous bas-reliefs and cuneiform inscriptions. His first book, *Nineveh and its Remains* (1848-9), aroused great interest, and was followed (1853) by *Discoveries in the Ruins of Nineveh and Babylon*. Layard was present in the Crimea, and did much to expose the maladministration during the war. He was under-secretary for foreign affairs (1852 and 1861-66), chief commissioner of works (1868-9), ambassador at Madrid (1869-77), and ambassador at Constantinople (1877-80). See *Autobiography and Letters* (1903).

Layering, a method of plant propagation which consists in bending a part of the plant under the soil, so that it may emit roots before being separated from the parent plant. In some instances it is sufficient to remove all buds from the shoot, with the exception of a few near its extremity, and to bend it and peg

it down so that a part of its proximal end is buried beneath the soil. In others it is necessary partly to cut through the stem at the point where it is to be covered with soil.



Layering.

Lay Reader. By the time of St. Cyprian it was the office of the readers, an inferior order of the clergy, to read all lessons in church, including even the gospel. In the Anglican Church readers are not actually ordained, but are laymen specially licensed by a bishop to assist in the work within his diocese. Lay readers are allowed, under certain circumstances, to read the prayers, and to preach, and otherwise to perform all ministerial functions which are not peculiar to those who have received holy orders.

Lazaref. See PORT LAZAREF.

Lazaretto (from *lazar*, 'a leper'), a word used in two distinct senses. (1.) A hospital for sick poor, especially lepers. Lazarehouses were common throughout Europe in the middle ages. Modern leper establishments exist at Bergen (Norway), Tracadie (New Brunswick), Robben Island (Cape Town), and Molokai I. (Hawaii). (2.) A place for the performance of quarantine. Almost the only countries maintaining quarantine in the old sense are Portugal, Spain, Turkey, and Greece.

Lazistan, coast strip on Black Sea, Asia Minor, E. of Trebizond, partly Turkish and partly Russian, and inhabited by the Lazis, a branch of the Georgian race, Caucasus.

Lazulite, a mineral, a hydrous phosphate of aluminium, magnesium, and iron; sometimes also called azurite and blue spar, from its blue colour.

L.C.C., London County Council.

L.D.S., Licentiate in Dental Surgery.

Lea, riv., England, rising in S. of Bedfordshire, flows S.E. into Hertfordshire, forming the boundary between that county and Essex and between Middlesex and Essex, and enters the

Thames below the Isle of Dogs. Length, 50 m., of which 28 are navigable.

Lead (Pb, 206.9) is a metallic element of which the principal ore is the sulphide, galena (PbS), which occurs in brittle gray cubic crystals having a metallic lustre, and cleaving readily. Cerussite, or lead carbonate (PbCO₃), and anglesite, or lead sulphate (PbSO₄), are also minerals of considerable commercial importance.

The methods of smelting the metal are as follows: (1) roasting and reaction; (2) roasting and reduction by carbon; (3) reduction by iron, or precipitation.

In the first method, or 'air-reduction' process, a high-grade galena is heated in the hearth of a reverberatory furnace in a current of air, until part of the lead sulphide is converted into lead oxide or sulphate. The air is then cut off, when the oxide or sulphate reacts with the unchanged sulphide, setting free lead, and yielding sulphur dioxide—*viz.* $2\text{PbO} + \text{PbS} = 3\text{Pb} + \text{SO}_2$, and $\text{PbSO}_4 + \text{PbS} = 2\text{Pb} + 2\text{SO}_2$. The molten lead collects in a depression of the hearth, and is tapped off.

Sometimes the process is carried out in open hearths fitted with a blast-pipe, and the reduction of the oxide aided by coal; a similar plan being employed with poor and oxidized ores, which are heated in a small blast-furnace with a flux such as limestone, and coke to set free the lead.

Reduction by iron is chiefly employed with ore containing other valuable metals, the ore being heated with scrap iron, or even iron oxide, in a blast-furnace, with the result of producing metallic lead, a matte containing sulphides of copper, silver, iron, and other metals, and a slag of silicate of iron.

The crude lead obtained by these processes requires to be purified for the market. The impurities may be divided into two classes—*viz.* (1) metals such as antimony, iron, and arsenic, which are oxidizable when heated in air; and (2) silver, which is not.

The former are removed by heating the lead in a reverberatory furnace with a shallow hearth, and by skimming off the dross containing the oxides.

Silver is removed either by Pattinson's or Parkes's process. The former depends on the fact that when a solution of silver in molten lead is allowed to cool and crystallize, the crystals contain less silver than the still molten liquid. By carrying this process out systematically, it is possible to obtain from lead containing as little as three or four ounces of silver to the ton, on the one hand, almost pure lead, or a

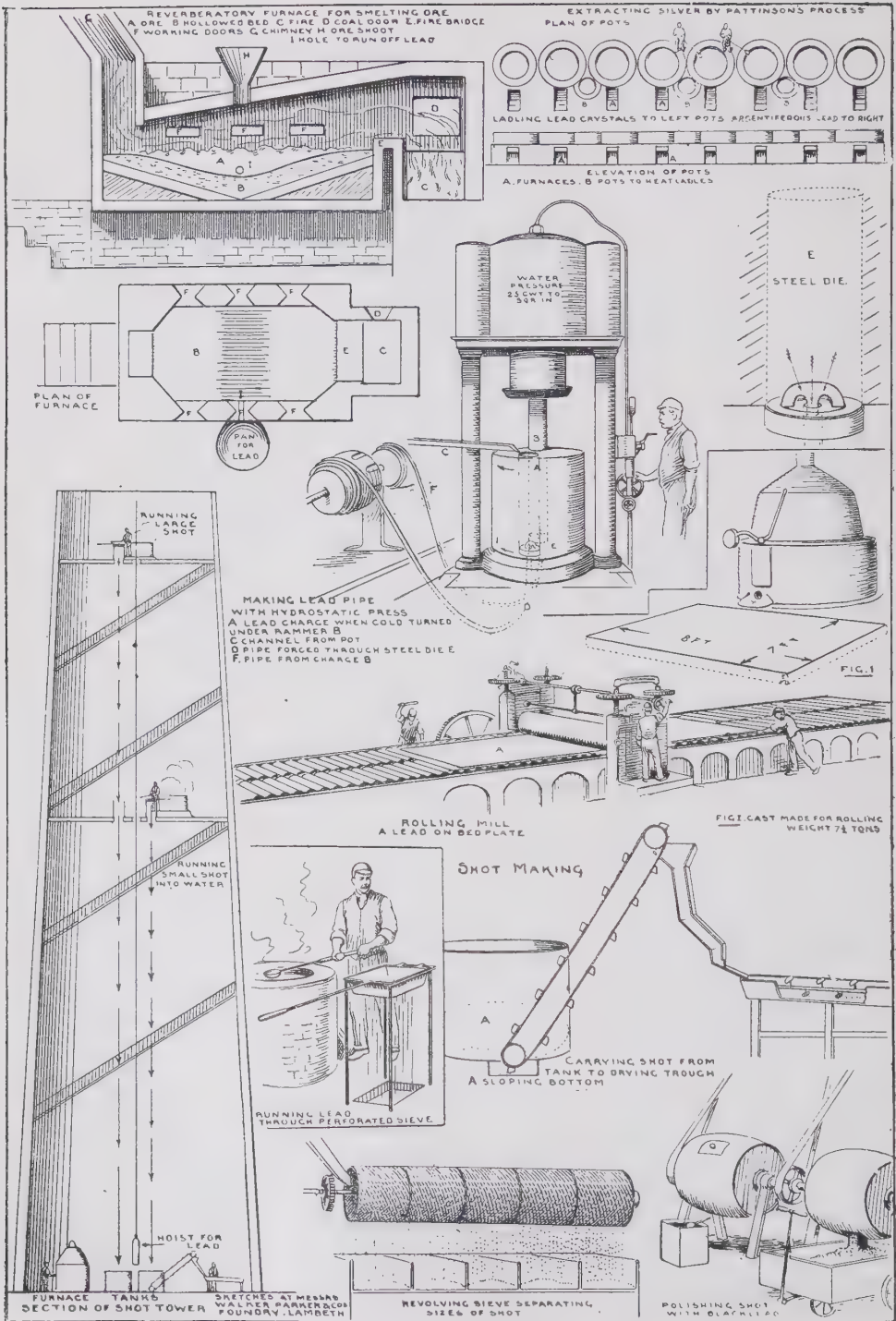
richly argentiferous lead containing about 700 oz. of silver to the ton on the other. The rich lead is then cupelled—*i.e.* heated in a blast of air—when the lead is oxidized and removed as dross, the silver being left. Parkes's process depends on the fact that the silver in lead can be dissolved out by molten zinc, the silver-zinc alloy floating on the lead, and being afterwards skimmed off.

Lead is a bluish-gray and very soft metal, malleable and ductile, but with little tenacity. Its sp. gr. is 11.3; it melts at 328° C., and is a poor conductor of electricity. In pure dry air lead remains untarnished; but in the presence of air and moisture it becomes dull, the coating of oxide, however, protecting the lead from further change. Heated in air, oxidation rapidly takes place, and the monoxide (PbO), known as litharge or massicot, is formed as a brownish-yellow solid.

Red lead, or minium (Pb₃O₄), is obtained by heating the monoxide in air; and the peroxide (PbO₂) can be separated from red lead as a dark brown powder with powerful oxidizing properties by treatment with dilute nitric acid. The sulphide of lead, besides occurring naturally as galena, can be prepared by direct union, or the precipitation of the solution of a lead salt with hydrogen sulphide. The soluble salts of lead, of which the acetate, sugar of lead (CH₃COO)₂Pb, and the nitrate, Pb(NO₃)₂, are the most important, are prepared by dissolving litharge or metallic lead in the dilute acid, and are colourless crystalline solids with an astringent taste. The sulphate, or anglesite (PbSO₄), and the chloride (PbCl₂), of which the former is very insoluble and the latter sparingly soluble, are prepared by precipitation of a solution of a soluble salt with sulphuric or hydrochloric acid. The basic carbonate (2PbCO₃Pb(OH)₂, or 'white lead,' is prepared by various processes, and is a white insoluble powder largely employed as a pigment by painters.

The salts of lead are strongly astringent, and are thus employed externally in lotions, in the treatment of ulceration and mucous discharges. Internally, the astringent action is of value in diarrhoea and internal hemorrhage, but, at the same time, overdoses act as violent irritants. See LEAD POISONING.

Lead itself is valuable, on account of its softness and the slight effect of air and water on it, as a material for roofing, and for making pipes and cisterns. On account of its specific gravity, lead is used for bullets and shot, the formation in the latter case of perfect spheres being



Lead Manufacture.

obtained by dropping the molten metal hardened by the addition of about 3 per cent. of arsenic. Lead alloyed with other metals produces useful alloys. Thus, with from 33 to 66 per cent. of tin solder is obtained, and with 80 per cent. pewter. Type metal contains from 15 to 18 per cent. of antimony and from 3 to 10 per cent. of tin; other tin, antimony, and lead alloys serve as bearing metals.

Of the compounds of lead, litharge and red lead are used in the manufacture of flint-glass, in glazing earthenwares, and in the preparation of drying oils. See Lambert's *Lead and its Compounds* (1902), Hes's *Lead Smelting* (1902), and Collins's *Metalurgy of Lead* (1899-1900).

Lead, SUGAR OF. See LEAD.

Lead, THE, an instrument for ascertaining the depth of water at sea, from 7 to 14 lbs. in weight, and usually of a shape similar to that of an old-fashioned clock-weight. Its lower extremity is hollowed, for the purpose of being filled with tallow, to ascertain what kind of ground the soundings are struck upon. Through a hole at the upper end is a flexible ring of leather, or cord, or other material, to which the line is attached. The line is 20 fathoms long, and is marked at definite intervals. It is prescribed in the *King's Regulations* that ships of the navy, when in pilot waters, or near land or shoals, shall constantly keep the hand-lead going. The weights of lead necessary for deep-sea soundings are, of course, much greater than those for ordinary purposes, and extend to 560 lbs. See NAVIGATION; Bedford's *Sailor's Pocket-book* (9th ed. 1898); Patterson's *Navigator's Pocket-book* (1894); Sigsbee's *Deep-sea Sounding and Dredging* (1880).

Lead, city, Lawrence co., S. Dakota, U.S.A., in s.w. of state, and in gold-mining region of the Black Hills. Pop. (1900) 6,210.

Leader, BENJAMIN WILLIAMS (1831), English landscape painter, born at Worcester; exhibited his first picture, *Cottage Children Blowing Bubbles*, in 1854. Leader visited the Highlands first in 1856, and mountain scenery became henceforth his speciality, North Wales and Scotland being his favourite haunts. In 1905 he exhibited, among other works, *The Incoming Tide on the Cornish Coast*, at the Royal Academy. He became R.A. in 1898.

Leadhills, mining vil., Lanarkshire, Scotland, 7 m. N.E. of Sanquhar; is the highest village (1,300 ft.) in the country. It has famous lead mines, the annual output of which is from 800 to 1,000 tons. Allan Ramsay, the poet, was a native. Pop. (1901) 835.

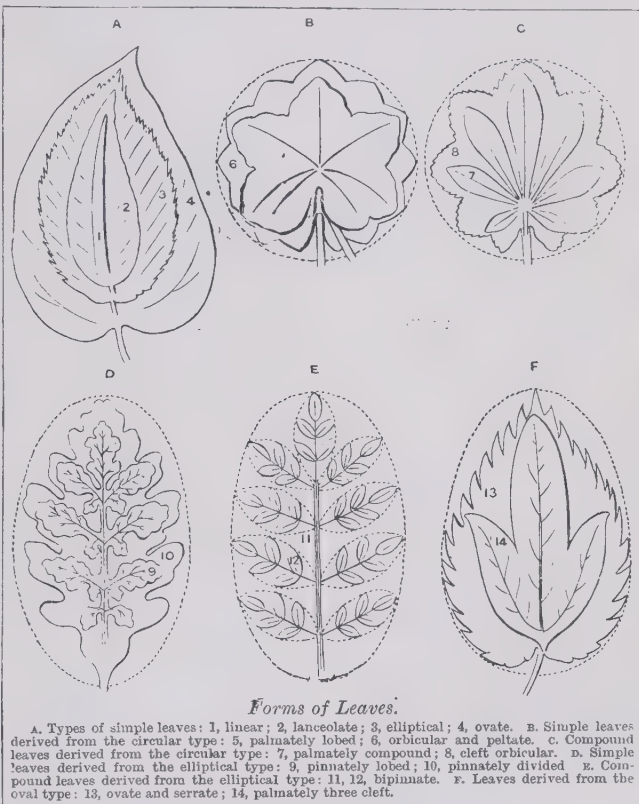
Lead Plaster consists chiefly of lead oleate, $(C_{17}H_{33}COO)_2Pb$, and glycerin, and is prepared by boiling litharge (PbO) with water and olive oil. It is used as the basis of many plasters employed in medicine, and for the preparation of standard solutions of soap for water analysis.

Lead Poisoning (synonyms, 'plumbism' and 'Saturnism') is a widespread form of poisoning, and occurs chiefly among those whose avocation compels them to handle compounds of lead.

appears along the margin of the gums a bluish-black line, which is caused by the deposit of sulphide of lead in the tissues.

Cleanliness of the hands and skin surfaces, and the use of respirators by those who are exposed to forms of lead which may be inhaled, should be insisted upon. To eliminate the poison from the system, potassium iodide, with frequent saline purgatives, ought to be given.

Leadville, city of Colorado, U.S.A., cap. of Lake co., near the



Painters, plumbers, glaziers, and pottery workers are specially liable to it. Drinking-water, cider, and wines, however, may become contaminated with lead, and certain compounds of the metal are capable of absorption by the lungs, or in the form of cosmetics by the skin.

The acute form of plumbism is marked by a rapid and grave anemia, along with severe colic, nervous symptoms, and often constipation, alternating with diarrhoea. The more chronic forms cause anemia, which may be profound, and in many cases there

Arkansas R., in a rich silver and lead mining region, 110 m. s.w. of Denver. Has large smelting furnaces. Pop. (1900) 12,455.

Leaf, one of the nutritive organs of a plant, arising from the stem, or a shoot, below the growing point, at certain intervals called nodes, the spaces between being termed internodes. In the leaves of monocotyledons the venation is for the most part parallel, while in those of the dicotyledons it forms a network. The expanded portion is the lamina or blade, normally attached to the axis by a stalk

or petiole, at the base of which there may be lateral appendages, usually one on each side. The mode of attachment varies greatly; and when there is no petiole, the leaf is said to be sessile. When the blade is in one piece, the leaf is simple. There is great variety of shape; but though Linnæus, in 1751,

example of a plant with leaves of two kinds. Those that float on the surface are more or less circular; those beneath the water are finely divided. Modifications for special functions may occur. Familiar examples in this country are the tendrils of the old man's beard (*Clematis vitalba*) and the traps of the bladderwort (*Utric-*

the roots; (2) respiration, or the interchange of inspired oxygen for expired carbon dioxide; and (3) assimilation, in which the carbon dioxide absorbed from the air is split up by the green colouring matter (chlorophyll), the oxygen being set free, and the carbon utilized as the foundation for organic products built up from water and earthy salts. This last function can take place only under the action of light. Leaf-structure is somewhat complicated, and for its full appreciation the compound microscope is necessary. It consists of fundamental tissue, covered above and below by a skin or epidermis, and traversed by vascular bundles, some of which serve as water-carriers, while others transport nutritive material into the body of the



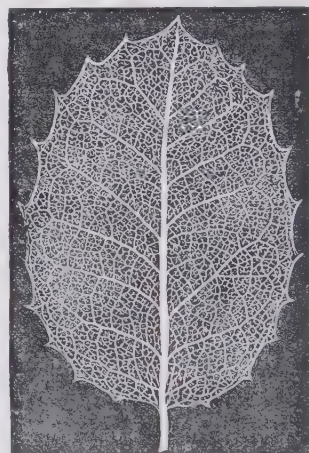
Modifications of Leaves.

A. Clematis: leaf stalks modified as tendrils. B. Coloured leaves of *Cornus florida*, surrounding the small flowers and rendering the flower head conspicuous. C. Bladderwort: some of the leaves converted into traps for insects. D. Water crowfoot: broad floating leaves and much-cut submerged leaves.

figured the outlines of forty-four forms, the number has now been reduced to a few simple mathematical types. A leaf split into leaflets is said to be compound. No two leaves are exactly alike; and the various forms bear some definite relation to the habit of the plant. The water-crowfoot (*Ranunculus aquatilis*), common in almost every pond, is a good

ularia). Some leaves take on the bright colours of petals, as in the Mexican Christmas flower (*Poinsettia pulcherrima*), and the members of the floral whorls (sepals, petals, stamens, and carpels) are only modified leaves.

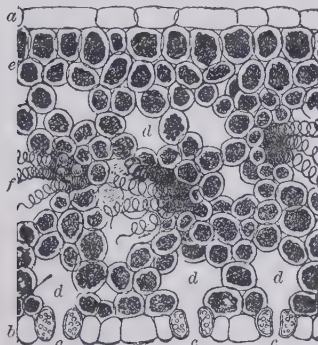
The functions of leaves are threefold: (1) transpiration, or the getting rid of surplus water, absorbed with earthy salts by



Skeleton Leaf (Holly).

plant. This system of vascular bundles is commonly called the venation, and may be well seen in decayed skeleton leaves. It is the green fundamental tissue, easily seen by stripping off the epidermis, which is the active agent both in respiration and in assimilation. In a transverse section of a leaf, viewed under a high power, one sees beneath the epidermis of the upper (or ventral) surface the vertically-elongated palisade cells, the vascular bundles, and the spongy tissue, enclosing irregular intercellular air-spaces, and bounded by the epidermis of the lower (or dorsal) surface. The pale colour of the under-surface is due to the spongy tissue containing a very much smaller percentage of chlorophyll granules than the upper. The lower epidermis is pierced with air pores or stomata, communicating with the intercellular spaces, and serving for the escape of air saturated with watery vapour.

Vernation is the manner in which each separate leaf is folded in the bud. *Phyllotaxy* is the arrangement of leaves on a stem; the commonest forms are alternate (at each node, first on one side, then on the other), opposite (on each side of each node), and verticillate (in a whorl round each node). By the same term is also



May: 1852 Section of Leaf.

a, Upper surface; b, under surface; c, stomata; d, intercellular spaces; e, palisade cells; f, spongy tissue.

indicated the relation of that part of a spiral which passes through successively ascending leaf-bases to the circumference. See Geddes's *Chapters in Modern Botany* (1893); Lubbock's *Flowers, Fruits, and Leaves* (1886).

Leaf Insects, called also **WALKING LEAVES**, belong to the family Phasmodæ of the order Orthoptera. All the members of the family show some resemblance to such natural objects as dried and withered leaves, sticks, bark, and pieces of moss; but it is in the genus *Phyllium* that the resem-



Leaf Insect.

blance to a leaf reaches its maximum. The members of the genus occur in tropical parts of the Old World, especially in islands. It is only the female which is markedly leaf-like, and the resemblance is produced by the anterior wings (*tegmina*), which in shape, veining, and colour very closely resemble the leaves among

which the insect lives, and on which it feeds. In addition, the legs bear foliaceous expansions, which increase the resemblance. The second pair of wings (true wings) is absent in the female, but present in the male. The eggs closely resemble seeds.

Leaf-mould, the name given to leaves so decayed as readily to break up into parts after the manner of soil or very rotten manure. It is of the greatest value as a fertilizer for plants. Oak and beech leaves make the best mould.

League, a measure of length originated in ancient Gaul, and estimated by the Romans as equal to 1,500 paces. It was introduced into England by the Normans, and measured two old English miles, or nearly three statute miles. It has fallen into disuse except as a nautical measure, when it equals one-twentieth of a degree, or three geographical miles, 3'456 statute miles.

Leagues, HISTORICAL. In Germany leagues of towns exercised considerable influence during the 14th and 15th centuries, whereas neither in France nor in England were any serious attempts made to form a similar union of towns. Leagues between nations were of little importance, and hardly existed before the 16th century. The crusades were, in a sense, leagues formed to oppose the Turks; and the third crusade especially represented the close union of England, France, and Germany. With Charles VIII.'s expedition to Italy (1494) modern history began, and new conditions arose. In 1508-9 the League of Cambrai was formed by Louis XII., Ferdinand of Spain, and the Emperor Maximilian, and was joined by Pope Julius II. (1509), for the purpose of diminishing the power of Venice. Hardly had the league succeeded in its aims when its members quarrelled, and Julius II. formed the Holy League to expel the French from Italy. During the rest of the century leagues were frequently made for a variety of purposes. Of these the most famous in the 16th century were the Smalkaldic League in Germany and the Catholic League in France. The former (1530) was a union of German Protestant princes to resist the attempts of Charles V. to extirpate Protestantism. It contributed powerfully to the overthrow of Charles V.'s schemes, and to secure the establishment of Protestantism in Germany. The Catholic League in France (1576) was nominally set on foot to defend Catholicism. But early in the reign of Henry III. it was headed by the Duke of Guise, and aimed at political

objects. The Thirty Years' war was heralded by the formation in Germany of the Protestant Union and the Catholic League.

Towards the end of the conflict between France and Spain, which continued after the peace of Westphalia, Mazarin contributed to the formation of the League of the Rhine, which was composed of powerful German princes, and was intended as a check upon the emperor. During the remainder of Louis XIV.'s reign the object of all the leagues that were formed was the diminution of the power of France. Thus, in 1686, the League of Augsburg was called into being by the seizure by Louis XIV. of Strassburg and German lands in the period of peace succeeding the treaty of Nimeguen. The Grand Alliance, which was formed in 1701-2, was a similar league, with similar objects. During the 18th century the most famous league was that of France and Spain, which were united by a series of family compacts. The united action of Europe in the war of liberation resembled rather the crusades than a league; but in this case it was directed against a Western not an Eastern conqueror. See Dyer and Hassall's *Hist. of Modern Europe* (3rd ed. 6 vols. 1901), and Stubbs's *Lectures on European History* (1904).

Leakage and Breakage. In bills of lading or charter-parties, the words 'leakage and breakage excepted,' or 'not accountable for leakage and breakage,' are often inserted for the protection of the shipowner, and their effect is to throw the burden upon the owner of the goods of proving that damage arising from leakage and breakage was actually caused by the shipowner or his agents in handling or stowing the goods.

Leake, SIR JOHN (1656-1720), English admiral, born in London; entered the navy, and was commander (1688), captain (1689), rear-admiral (1702), full admiral (1707), and first lord of the Admiralty (1710). He saw service at the relief of Londonderry, Barfleur, and Malaga, and in 1705-7 commanded in the Mediterranean. See *Life* by S. M. Leake (1750).

Leake, WILLIAM MARTIN (1777-1860), English archaeologist and numismatist, born in London; was sent by government on a mission to the East (1808), and travelled widely in Asia Minor and Greece, combining archaeological and geographical labours with diplomatic duties. He was the first classical scholar to explore the Peloponnesus. His chief works are *The Topography of Athens* (1821), *Tour in Asia Minor* (1824), *Travels in the Morea* (1830), *Numismata Hellenica* (1854-5). See *Memoir* by Marsden (1864).

Leamington, or ROYAL LEAMINGTON SPA, munic. bor., Warwickshire, England, 2 m. E. of Warwick, on the Leam. It is much frequented for its mineral waters (sulphureous, chalybeate, and saline). Manufactures kitchen ranges. Pop. (1901) 26,888. See Garrod's *Medicinal Springs of Leamington* (1895).

Leander, a British second-class cruiser, launched in 1882. Since 1780 there have been British men-of-war of this name, which is associated with the attack on Santa Cruz (1797), the battle of the Nile (1798), and the bombardment of Algiers (1816).

Leander, in ancient Greek story, a youth of Abydos, on the Hellespont, who loved Hero, the priestess of Aphrodite, in Sestos, and swam the strait every night to visit her. The lighthouse at Sestos guided him; but one stormy night its light failed, and he was drowned. Next morning his body was washed ashore at Sestos, and Hero, seeing it, cast herself into the sea. The story is told by Musæus in his epic of Hero and Leander, and is also referred to by Ovid, Statius, and Virgil. See also Marlowe and Chapman's *Hero and Leander* (1598).

Leap Year. When Julius Cæsar reformed the Roman calendar, he added a day every fourth year in order to make the average solar year 365½ days. This was done by doubling the sixth day before the Calends of March, and hence the year was called bisextile—a name it still retains among the Latin nations of Europe, by whom February 24 is regarded as the intercalated day. In the British Isles this year is called leap year, because the Sunday letter *leaps* a day, no letter being affixed to February 29.

Lear, EDWARD (1812-88), English artist and author, was born in London; began drawing in the Zoological Gardens, assisted Gould in his *Birds* (1832-6), and worked under Lord Derby's patronage on *The Knowsley Menagerie*. It was for the earl's grandchildren Lear produced his famous *Book of Nonsense* (1846), which went through twenty-seven editions. He also wrote *The Journal of a Landscape Painter in Corsica* (1870). Tennyson addressed to him a famous lyric. See *Memoir* by Franklin Lushington, prefixed to *Poems, illustrated by Edward Lear* (1889).

Lease. See LANDLORD AND TENANT.

Leasing Making, in Scots law, the crime of speaking evil of the king personally. In modern days it is not treated as a crime unless it forms part of a treasonable transaction. See SEDITION.

Leather. Owing to the variety of purposes to which leather is applied, and the considerable differences in the hides and skins which are used in its manufacture, the processes of leather manufacture are complicated and numerous. Technically, the trade is divided into many sections, such as tanning, currying, and leather-dressing.

The skins of the mammalia consist of two principal layers, of which the inner is called the *corium*, or 'true skin'; while the outer, or *epidermis*, though perhaps biologically it has the greater claim to be considered the true skin, is valueless to the tanner, who makes it his first business to remove it. The leather-producing corium consists of a network or felt of white fibres, each in its turn capable of being split into finer fibrils, finer and more closely felted near the outer surface of the skin, which is called the 'grain.' Chemically, the skin-fibres are closely allied to gelatin, into which they are rapidly converted by boiling with water, and of which they are one of the principal sources. The hair or wool is rooted in the outer or 'grain' surface of the corium, but is really a product of the epidermis layer, which sinks into and lines the orifices in which the hairs are rooted.

Skins dressed with the hair on belong rather to the class of furs than to leathers, and the first treatment to which hides and skins intended for the latter are subjected is usually immersion and moving about in a milk of caustic lime, which loosens the hair by dissolving the cells of the epidermis. This process, which lasts from one to three weeks according to the character and thickness of the skin, also causes the gelatinous fibres to absorb water and swell, at the same time dissolving the 'cementing substance' between them, loosening them from one another, and separating them into their finer fibrils. The further this action is carried, the softer and looser is the resultant leather. In place of liming, the hair of ox and cow hides for sole leather is sometimes removed by 'sweating' or incipient putrefaction, caused by hanging in a warm and moist chamber. In this case the swelling and loosening of the fibre do not take place, and the hides, which must be subsequently swollen by acid in the tanning process, make a very firm and solid leather. The process of 'sweating' is also frequently applied to sheepskins, with the object of removing the wool without the injury which is caused to it by liming, to which the skins are subsequently sub-

jected. Alkaline sulphides are now frequently used to assist or replace the lime in unhairing.

When the hides or skins come out of the limes, the loosened hair is removed by scraping on a sloping rounded wooden beam (Fig. 3) with a blunt two-handled knife; and subsequently the loose subcutaneous tissue and adhering flesh and fat are scraped and cut off on the same beam by a somewhat similar knife with two edges, one of which is kept very sharp.

So far the process is the same, except in details, whether the goods are heavy hides for sole leather, or lamb and kid skins for gloves; but from this point it diverges. Sole-leather hides are usually merely washed with water to remove as much lime as possible, and after trimming or 'rounding' are ready to be tanned. Hides and skins for soft leathers, however, require not merely to be more carefully freed from lime, but brought down from their swollen condition to one of flaccidity and softness. This is usually accomplished by the action of fermenting infusions of excrement—that of pigeons and fowls being employed for hides and heavy skins, and that of the dog for the finer leathers. Recently, the work of Mr. J. T. Wood in England (*Jour. Soc. Chem. Industry*, 1898 and 1899), and of Drs. Popp and Becker in Germany, has resulted in the preparation of a nutritive medium 'erodin,' prepared by chemical treatment of gelatinous matter, which, when inoculated with a pure culture of suitable bacteria, is capable of exactly imitating the effect of the fermenting infusions, with much less danger to the skins. They are now ready for conversion into leather, either by the ordinary tanning process with vegetable materials, by 'tawing' with alum and salt, or by any of the various 'combination' and chrome tannages which are now largely used.

Tanning with vegetable materials is still more largely used than any other method. In principle it always consists in bringing the prepared skin or hide at first into weak infusions of the tanning material, which have generally been previously used for more nearly tanned goods, and gradually changing and strengthening these infusions till the process is complete.

The bark of the oak is one of the oldest and perhaps the most satisfactory of tanning materials, but its place has been largely taken by other vegetable products.

In sole-leather tanning, in this country, oak bark, valonia, and oak wood and chestnut extracts

are now the most important materials. The 'butts,' or hides from which the necks, shoulders, and thinner parts from the belly have been removed by 'rounding,' or trimming, after washing, are suspended in pits containing weak and previously used liquors. They are frequently moved, or are kept in gentle oscillation by machinery, and after a week or ten days in suspension, during which time they are gradually advanced into stronger liquors, they are transferred to pits called 'handlers,' in which they are laid flat in liquors, and handled daily, by being raised with long-handled hooks, and pulled over into the next pit, the 'packs' or parcels of butts being arranged in order of progress in tanning, and consequently of strength of liquor, so that the 'forward' pack is advanced into a new liquor, and each of the others follows into the liquor which was previously occupied by the next in front of it. After some weeks of treatment of this sort, in the later stages of which the butts are frequently sprinkled with some dry 'dusting' material, such as ground bark, valonia, or myrobalans, they are ready for the 'layers'—the final stage of the sole-leather tannage. Formerly two years or more was frequently occupied in tanning sole leather, and some tanners still take twelve months, though three or six months is probably much more common. The various 'electric' processes of tanning, which have been from time to time largely advertised, have probably in most cases depended for their efficacy on mechanical motion, the use of strong liquors, and the heat evolved by the friction, rather than on any immediate electrical effect.

Sole leather is finished by stretching and smoothing with a two-handed tool of triangular section called a 'striking pin,' and by rolling with heavily-loaded brass rollers, both of which operations are now generally performed by machines. The leather must be partially dried before it is 'struck' and rolled, and the drying is finally completed at a gentle heat.

Dressing leathers, such as are used for the uppers of heavy boots, and other purposes for which moderately soft leathers are required, are limed and usually coloured in weak and old tanning liquors in a large vat provided with a paddle-wheel to keep the hides and liquor in motion. The remainder of the process is similar to that used for sole leather, but weaker liquors are employed, shorter time is required, and in many cases the use of 'layers' is dispensed with.

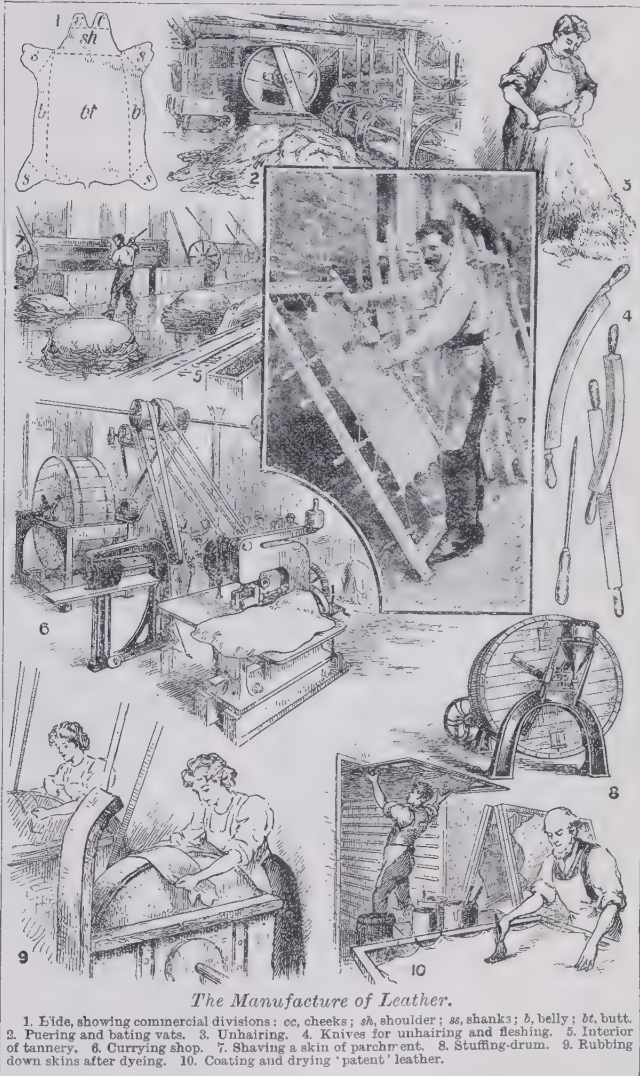
(5)

Currying is the finishing process of all the heavier 'upper leathers,' as well as of those intended for harness, belting, and other purposes where flexibility and resistance to water are required. In principle it con-

sists in impregnating the leather with fats and oils; but many mechanical processes, such as scouring, stretching, and shaving, designed to level, smooth, and improve the appearance of the leather, are included in it.

Most shoe leather is now stuffed in rotating drums, heated by steam to a sufficient temperature to melt

the stuffing-grease, which is generally much harder than the dubbing used in hand-stuffing. After drying, the leather is generally 'whitened' on the flesh side, on the table, with a 'sleeker' having its edges turned forward.



The Manufacture of Leather.

1. Hide, showing commercial divisions: cc, cheeks; sh, shoulder; ss, shanks; b, belly; bt, butt. 2. Puering and bating vats. 3. Unhairing. 4. Knives for unhairing and fleshing. 5. Interior of tannery. 6. Currying shop. 7. Shaving a skin of parchment. 8. Stuffing-drum. 9. Rubbing down skins after dyeing. 10. Coating and drying 'patent' leather.

If intended for 'waxing,' the skins are then grained with the cork-board.

The flesh side is next blacked with a mixture of lampblack and oil or soap, sized, the surface then smoothed by friction or pressure with a smooth glass tool, and a second sizing given, which completes the finish.

2 A-234

Patent and enamelled leathers are made by coating ordinary leather with a varnish made by boiling linseed oil with Prussian blue. Many successive coats are applied, the earlier ones being smoothed by pumicing. The drying is accomplished partly in heated 'stoves' and partly by exposure to the sun.

Morocos are goatskins, usually tanned with sumach, either in the paddle-vat, or by sewing the skin to form a bag, which is filled with strong sumach liquor and floated in a vat of the same. They are glazed by damping with a very weak solution of albumin (or blood) and milk, and, after drying, are polished by friction under a hardwood, glass, or agate cylinder, generally operated by a machine.

Kid leather is a term rather distinguishing a mode of dressing than the skin of a particular animal. Glove kid is mostly made from the skins of young lambs, though kidskins are often used for the best qualities; while 'calf kid' is employed for light boots with a dull black surface, and 'glazed kid,' made from goatskins, for the finer sorts of ladies' boots.

Chrome leathers ('box calf,' 'willow calf,' etc.) are tanned by somewhat complex processes in which salts of chromium take the place of those of alumina, and are subsequently softened and made more waterproof by drumming with an emulsion of soaps and oils.

Chamois leather is generally made from the inner or flesh-split of sheepskins, though for gloves and finer purposes deerskins (buckskin) are sometimes used. Buff leather is a similar product from ox or cow hides.

See Procter's *Principles of Leather Manufacture* (1903), Davis's *Manufacture of Leather* (1897), and De Reey's *The Decoration of Leather* (trans. 1905).

Leather, AMERICAN. See AMERICAN CLOTH.

Leather-wood, a deciduous shrub (*Diospyros palustris*), order Thymelaeaceæ, a native of N. America. It grows to about four feet in height, and its very tough bark is used for making ropes, paper, and baskets.

Leathes, STANLEY (1830-1900), English Hebraist and writer, was born at Ellesborough, Buckinghamshire. He became professor of Hebrew at King's College, London (1863), and in 1870 joined the Revision Committee of the Old Testament. Among his works are *The Witness of the Old Testament to Christ* (1868), *The Gospel its own Witness* (1874), *Christ and the Bible* (1885), and *The Law in the Prophets* (1891).

Leave, MILITARY. See OFFICERS.

Leaven (in the Bible). The distinction between leavened and unleavened bread was of considerable importance in the ritual of the Hebrews. While leavened bread was in general use, the leaven was, from haste or other causes, sometimes omitted. It was the lack of time which caused the Israelites to prepare unleavened bread on the eve of their departure from Egypt (Exod. 12:34), and the 'seven days of unleavened bread' (12:15) were observed in commemoration of this, and in connection with the feast of the Passover. During that period the bread eaten was *mazzoth*—i.e. sweet or unleavened cakes. No leavened bread was permitted in sacrifice (Exod. 23:18). Such prohibitions were based on the idea that fermentation was a kind of corruption; and it is probably the same idea that underlies the reference of Christ to the leaven of the Pharisees and Sadducees (Matt. 16:6), and Paul's phrase, the unleavened bread of sincerity and truth (1 Cor. 5:8). Instances of a similar objection to leaven are found among heathen peoples (Plutarch's *Quest. Rom.*, 109). See commentaries on Exodus.

Leavenworth, city of Kansas, U.S.A., cap. of Leavenworth co., situated in E. of the state, on the Missouri R., 25 m. N.W. of Kansas City. Has coal mines, and manufactures bricks, stoves, furniture, machinery, and flour. North of the city is Fort Leavenworth, a military post. Pop. (1900) 20,735.

Lebanon, city of Pennsylvania, U.S.A., cap. of Lebanon co., situated in S. of state, in the iron region, 90 m. N.W. of Philadelphia. Industries: iron-mining, machinery, and brick-making. Pop. (1900) 17,628.

Lebanon, MOUNT (Lat. *Libanus*), a mountain range in Palestine and Syria, called by the Arabs Jebel-el-Gharbi, 'the white mountains.' It runs from N.E. to S.W. for 95 m. from Nahr Kasmiyeh, known as the river Litany, the ancient Leontes, to Nahr-el-Kebir, the ancient Eleutherus. The plain of Cœle-Syria (modern Bekaa) divides Lebanon from Anti-Libanus, which, starting from the Barada (Abana), runs 65 m. parallel to Lebanon. The mean elevation of the Lebanon range is from 6,000 to 8,000 ft., that of Anti-Libanus from 5,000 to 6,000 ft. The Lebanon streams, with few exceptions, rise on the W. side and drain towards the Mediterranean. Villages are scattered over the ranges. A narrow-gauge railway, opened in 1895, has taken the place of the road across the mountains from Beirut to Damascus. Wheat, the vine, the mulberry, and the walnut are

abundant. Once covered with trees, the mountains are now bare, only a few groves remaining of the famous cedars. They stand on the W. slopes of Jebel Makhmal, at an alt. of 6,000 ft. Silk is largely manufactured. Coal mines are worked, and iron ore is abundant. The climate is healthy. In 1861, after the wars between the Maronites and Druses, the government of the mountains was reorganized. A Christian governor, with a summer residence at Beit-ed-Din and a winter residence at Baabda, was appointed under the general protection of the powers. The population, variously estimated at from 260,000 to 400,000, consists mainly of Maronites in the N., Greek Christians and Druses in the S. See standard works on Syria and Palestine by Robinson, Buhl, and George Adam Smith; also Fraas's *Drei Monate im Lebanon* (1876).

Lebedin, tn., Kharkov gov., S. Russia, 90 m. W.N.W. of Kharkov city; famous as the centre of Peter the Great's campaign against Mazeppa in 1709. Pop. (1897) 14,206.

Lebedyan, tn. of Tambov gov., Central Russia, 130 m. W. of Tambov city, cap. of dist., on l. bk. of Upper Don. Trade in cattle and horses, cereals, furs, and leather. Pop. 13,352.

Leblanc Soda Process. See SODIUM.

Lebœuf, EDMOND (1809-88), French general; entered the artillery in 1832, and gained distinction in the Crimean and Italian campaigns. His misfortunes began when in 1869 he was appointed war minister. Unequal to the administration of a great department, he believed the deficient armament of France to be in a state of complete preparation. After his appointment in 1870 as marshal of France, the revelation of his mistakes forced him to take a minor command, and he courted death recklessly at Gravelotte, Noisseville, and elsewhere, and was made prisoner at the fall of Metz. He returned from a German prison to face an inquiry with characteristic courage and candour, and then retired from public life.

Le Bossu, RENÉ (1631-80), French critic, canon regular of Sainte-Geneviève, won a European reputation by his *Traité du Poème Epique* (1675). It was well known in England, being praised by Dryden, used by Addison for his papers on *Paradise Lost*, and given in extract in the prefatory matter to Pope's *Odyssey*. An English translation, by 'W. J.,' appeared in 1695, and again in 1719. See Memoir by Le Courayer, prefixed to the sixth edition of the *Poème Epique* (1714).

Lebrija (anc. *Nebrissa Veneria*), tn., Seville, Spain, on a declivity of the Sierra de Gibaldin, 34 m. s. of Seville, on the Seville-Cadiz Ry. Trade in grain, oil, wine, and cattle. The ruined castle exhibits a mixture of Arabic, Roman, and Gothic architecture. Pop. (1900) 11,127.

Le Brun, CHARLES (1619-90), French historical painter, born at Paris, and was employed for fifteen years by Louis XIV. on the decoration of Versailles. Le Brun enjoyed a great reputation in his day, but his style is now considered extremely artificial and affected. See *Lives* by Genevay (1835) and Jouin (1890).

Robespierre, and Napoleon. His satires and epigrams possess some distinction. A collection of his works appeared in 1811, and his *Œuvres Choiesies* in 1822-8.

Le Caron, HENRI (1841-94), whose real name was Thomas Miller Beach, British secret service agent, born in England. A prominent member of the Fenian body, he was aware of their conspiracy against Canada; and becoming in 1865 a spy of the British government, he supplied it with all the information which his position laid open to him. In the Parnell Commission of 1889 he was called as a witness. Henceforth he was unremittingly

copper, silk, and cotton. Manzoni describes the district in his *I Promessi Sposi*. Pop. (1901) 10,275.

Lech, r. bk. trib. of the Danube, Austria and Germany, rising in Lake Formarin (6,120 ft.) in the Vorarlberg, flows N.E. through Tyrol, then N. through Bavaria, and after a course of 180 m. falls into the Danube below Donauwörth. It is not navigable, but timber is floated down its waters from the Bavarian frontier.

Lechler, GOTTHARD VICTOR (1811-88), German theologian, was born at Kloster-Reichenbach, Württemberg, and studied under Baur at Tübingen; in 1858 he



Mount Lebanon and its Cedars.

Le Brun, MARIE LOUISE ELISABETH VIGÉE (1755-1842), French painter, born at Paris; married (1776) a grand-nephew of Charles Le Brun. Her beauty and talent quickly made her a favourite at court, and she painted many of the great personages of the time, including Marie Antoinette, the Prince of Wales, Byron, and others. The Louvre contains many of her best works, notably the portrait of herself and her daughter. See her *Souvenirs* (1835-7).

Lebrun, PONCE DENIS ECOUCHARD (1729-1807), French poet; acted as secretary to the Prince of Conti, and was subsequently under the patronage of Calonne,

guarded until his death. See his *Twenty-five Years in the Secret Service* (1892).

Lecce (anc. *Lupiae Civitas*), cap., prov. Lecce, Apulia, Italy, 23 m. S.E. of Brindisi. Its ancient fortifications are now in ruins; several monumental gateways, however, still remain. Trade in Lecce oil, tobacco, cotton, wool, soap, and leather, while the district produces fruits and grain. The city is connected by electric cars with San Cataldo, much visited on account of its castle. Pop. (1901) 32,687.

Lecco, city, prov. Como, Lombardy, Italy, 15 m. N.E. of Como, on the S.E. arm (Lake Lecco) of Lake Como. Manufactures iron,

became a professor at Leipzig, where he died. His most important works are *Geschichte des englischen Deismus* (1841); *Das apostolische und nachapostolische Zeitalter* (1851; Eng. trans. 1886); *Commentary on Acts*, in Lange's *Bibelwerk* (trans. 1879); and *Johann von Wiclif* (1873; trans. 3rd ed. 1884).

Lecithin, a compound, or mixture of compounds, of complex composition, having approximately the formula $C_{42}H_{84}NO_8$, which is an important constituent of nervous tissue and yolk of egg. It is prepared from the latter, and is soluble in alcohol, from which it crystallizes in waxy needles.

Lecky, WILLIAM EDWARD HARTPOLE (1838-1903), Irish man of letters, was born near Dublin, and educated at Trinity College there. He published anonymously (1861) *The Leaders of Public Opinion in Ireland* (new ed. 1903), and devoted himself chiefly to historical work till 1895, when he was elected one of the parliamentary representatives for Dublin University, a position which he resigned in 1902. Among his other works were *History of Rationalism in Europe* (1865); *History of European Morals from Augustus to Charlemagne* (1869); *History of England in the Eighteenth Century* (1878-90); *Poems* (1891); *Democracy and Liberty* (new ed. 1899); and *The Map of Life* (new ed. 1901).

Leclaire, EDMÉ JEAN (1801-72), originator of the system of profit-sharing between employer and employed, born at Aisy-sur-Armançon; went to Paris, and started business as a house-painter. His system was first tried in 1842, and proved eminently successful. See *Hart's Maison Leclaire* (1883).

Leclanché Cell. See **CELL**, VOLTAIC.

Le Clerc, JEAN (1657-1736), Swiss writer and theologian, born at Geneva; was professor at the Remonstrant seminary, Amsterdam (1684-1728). His greatest works were the *Bibliothèque Universelle et Historique* (25 vols. 1685-93), the *Bibliothèque Choix* (1703-13), and the *Bibliothèque Ancienne et Moderne* (1714-27); but his wide learning was also proved by his editions of the ancient classics and his *Ars Critica* (1712-30). See Hoeven's *De Johanne Clerico* (1845).

Leclercq, CARLOTTA (c. 1840-93), English actress, born in London, of a family intimately connected with the stage. Among her parts were Lucy Ashton in *The Master of Ravenswood* and *Mercédès* in *Monte Cristo*.

Leclercq, ROSE (c. 1845-99), English actress, younger sister of Carlotta Leclercq, born at Liverpool; was the original Mary Vance in Burnand's *Deal Boatman* at Drury Lane, and played Desdemona to Phelps's Othello. Later she took Lady Dawtry in *The Dancing Girl*, and Mrs. Beech in Henry Arthur Jones's *Manœuvres of Jane*, at the Haymarket (1898).

Lecluse. See **CLUSIA**.

Lecocq, ALEXANDRE CHARLES (1832), French composer of comic operas. His style is light and happy, and many of his works are popular. They include *Les Cent Vierges* (1872); *La Fille de Madame Angot* (1873); *Les Près St. Gervais* (1874); *Giroflé-Girofla* (1874); and *La Marjolaine* (1877).

Le Conte, JOSEPH (1823-1901), American essayist and geologist,

born in Georgia. He became professor of geology at the University of California (1869). His chief works are *Mutual Relations of Religion and Science* (1873); *Sight* (1881); *Compend of Geology* (1884); and *Evolution and its Relation to Religious Thought* (1888).

Leconte de Lisle, CHARLES MARIE (1818-94), French poet, born at St. Paul, Isle of Bourbon; son of an army surgeon; intended by his father for a mercantile career, with a view to which the boy was sent upon extensive travels in the East. But he returned to Paris, and assisted in the foundation of a paper, *Le Sifflet*. Leconte de Lisle's first poem, *Venus de Milo* (afterwards incorporated in his *Poèmes Antiques*), was published in 1848, and showed a keen interest in politics, with a strong republican bent. After the establishment of the second empire, however, Leconte de Lisle ceased to take an interest in public affairs. His *Poèmes Antiques*, which appeared in 1852, contained some of his best work. Over this he secured the friendship of such men as Léon Dièrx, Sully Prudhomme, François Coppée, Armand Silvestre, José Maria de Heredia, Villiers de Lisle Adam, and, greatest of all, Paul Verlaine. Leconte de Lisle was a strong pessimist and anti-Catholic. But even when he is dealing with themes which might evoke these sentiments, he treats them only with a poetic passion. In 1872 Leconte de Lisle was made librarian to the Senate, and in this post he died. His works include *Poèmes Antiques* (1852); *Poèmes et Poésies* (1854); *Le Chemin de la Croix* (1859); *Poèmes Barbares* (1862); *Erinnyes* (1872); *Poèmes Tragiques* (1884); *Derniers Poèmes* (1899); *L'Apollonide*; with translations of *Theocritus* (1861), *Anacréon* (1861), *The Iliad* (1866), *The Odyssey* (1867), *Hesiod* (1871), *Æschylus* (1872), *Horace* (1873), *Sophocles* (1877), and *Euripides* (1885). See Bourget's *Nouveaux Essais de Psych. Cont.* (1886), and Dornis's *Leconte de Lisle* (1895).

Lecouvreur, ADRIENNE (1692-1730), French actress, celebrated alike for her brilliant gifts and the tragic ending of her life, was born near Châlons. Going to Paris, she quickly achieved success by her talent and beauty; and her real life, like her acting, was a stormy Elysium, filled with the loves of many famous men, including Marshal Saxe and Voltaire. Her death was attributed to poison administered by the Duchesse de Bouillon, a rival for Saxe's affections; whence the plot of Scribe and Legouvé's play *Adrienne Lecouvreur*. See *Lettres D'Adrienne Lecouvreur* (1892).

Lectern, a reading stand, used in churches for reading the *lections* or lessons from, and for supporting the massive service books from which the antiphons were sung, as also for use in libraries. They were generally movable, of wood or brass, perhaps the commonest form being that of an eagle with outspread wings on which the book rested.

Lectiary, a book containing 'lessons' or portions of Scripture appointed to be read in the public service of the church in the course of a year. The oldest Latin lectiary, ascribed to St. Jerome, was known as the *Comes* ('companion'), distinguished as 'major' and 'minor.' In the Anglican Church the form of the lectiary was fixed in 1661; but a royal commission was appointed in 1867 to consider its revision, and in accordance with its report a new table of lessons was drawn up which became obligatory (1879).

Lecturer. In the Church of England persons in holy orders may be licensed by the archbishop or bishop, with the assent of the patron and incumbent, to officiate as lecturer or preacher in a parish church or in some chapel. A lecturer may be required by the bishop to perform other clerical duties in the parish or chapel with the assent of the incumbent. Some lectureships have been founded by statute or exist by ancient custom.

Lectures, formal discourses, written or unwritten, delivered upon any subject, especially one intended for the instruction of an audience. To nearly all universities are now attached, in every branch of learning, lectureships, a number of them founded, like the lectureships of poetry and fine arts in Oxford, for a definite period, and others as permanent as professorships, only differing in the matter of status.

Of temporary lectureships, the principal are those connected with particular foundations by individual donors for the delivery of treatises advocating the views or subjects which the donors have favoured. Among these are the Bampton lectures at Oxford, the Boyle at London, the Hulsean at Cambridge, the Warburtonian at Lincoln's Inn, the Hibbert at Oxford and London, the Donnellian at Dublin, the Baird, Croall, and Cunningham lectures at Edinburgh, and, in connection with the Scottish universities, the Gifford and Burnett lectures. Then, in connection with special bequests, there are the annual Harveian, Croonian, and Plumian 'orations,' as valuable to those who deliver the speeches as to those who have the opportunity of listening to them.

The 'University Extension' lectures, for which Professor Max Müller was mainly responsible, were inaugurated at Oxford in 1885-6, when outside the university twenty-seven courses of lectures were delivered in the provinces by members of the university, increased in 1890 to 109 courses, attended by 17,904 students. (See article by Professor Müller in *The New Review*, vol. iii.) In Cambridge, also, there is a vigorous scheme of University Extension lectures, a course of twelve lectures being given in each term, with affiliated centres at Derby, Exeter, Hull, Newcastle, Norwich, Plymouth (with Stonehouse and Devonport), Scarborough, and Sunderland. London University has a similar scheme, presided over by Lord Avebury, consisting of two winter terms, each of ten weeks, with lectures, conversational classes, written papers, and final examinations, and a summer course of twenty-five weeks.

Lecythidaceae, a group of plants forming a subdivision of the order Myrtaceae. They are natives of Guiana and other hot parts of S. America.

Leda, a British first-class torpedo gunboat, launched in 1892. Since 1783 there have been ships of this name in the navy.

Leda, in ancient Greek legend, was the daughter of Thestius, and wife of Tyndareus, king of Sparta, to whom she bore Timandra and Philonoe. Zeus visited Leda in the form of a swan, and by him she was the mother of Castor and Pollux. The story is told by Homer, Euripides, and other ancient writers.

Ledbury, par. and mrkt. tn., Herefordshire, England, on a declivity of the Malvern Hills, 11 m. N.E. of Ross; has valuable cider orchards and hop grounds. Roman remains are found in the vicinity. The hospital of St. Catherine dates from 1300. A charter entitling the town to fairs and markets dates from the reign of Stephen. Pop. (1901) 9,764.

Ledeberg, N.E. suburb of Ghent, Belgium. Pop. (1900) 14,230.

Ledochowski, MIECZYSLAW, CARDINAL COUNT (1822-1902), Polish Roman ecclesiastic, born at Gorki in Galicia. For many years he resisted the repressive measures of the Prussian government against the influence of the Roman Catholic Church. The celebrated 'May laws,' promulgated at the time of the *Kulturkampf*, were enforced in 1873, and Ledochowski was imprisoned (1874-6). After his release he resided in Rome. From 1892 till his death he was prefect of the Propaganda. Pius IX. made him cardinal (1875).

Ledru - Rollin, ALEXANDRE AUGUSTE (1807-74), French barrister and politician, born at Fontenay. At the revolution of 1848 he became a member of the provisional government, and later a candidate against Louis Napoleon for the presidency. An unsuccessful attempt at rebellion forced him to seek refuge in England. In 1870 he returned to France under the law of amnesty. He was the author of *De la Décadence de l'Angleterre* (1850). His collected works appeared under the title *Discours Politiques et Ecrits Divers* (1879).

Leduc. See VIOLETTE-LE-DUC.

Ledum, a genus of dwarf, hardy, evergreen shrubs, belonging to the order Ericaceae. The flowers are white, and are borne in umbels. The chief species are *L. palustre*, the so-called wild rosemary, about eighteen inches in height, with its varieties *L. p. dilatatum* and *L. p. decumbens*; *L. latifolium*, taller and with broader leaves than *L. palustre*; and *L. glandulosum*.

Lee, a word meaning a sheltered place, and, in its nautical sense, those parts that are away from the windward side. 'Lee-way' is the way a ship makes away from the windward quarter when under sail, so that her wake is not in the same straight line as her keel. 'Lee-side,' all that part of a ship which is away from the windward quarter, consisting of half the ship, divided by an imaginary line fore and aft. 'Lee-shore:' a ship is said to be on a lee-shore when she is near the land with the wind blowing from her to it. 'Helm a-lee' is the order to put the helm down towards the leeward side, so as to bring a ship nearer to or into the wind.

Lee, riv., Co. Cork, Ireland, flows E. through the city of Cork to Queenstown harbour; length, 45 m.

Lee, ANN (1736-84), founderess of the American Society of Shakers, was born at Manchester, the daughter of a blacksmith. She took to open-air preaching in Manchester, which led to imprisonment for Sabbath-breaking (1770), and while thus confined a vision of Christ and a revelation regarding His second coming was said to have been granted to her. Subsequently she became head of the Shakers, and was styled 'Mother Ann.' Emigrating to America (1774), she founded the first American Shaker settlement at Niskenna (1776). See SHAKERS.

Lee, FITZHUGH (1835), American soldier and diplomat, was born at Clermont, Virginia. On the outbreak of the civil war (1861) he joined the Confederate army, afterwards serving with

distinction in Virginia as a cavalry officer. He became brigadier-general (1862), and major-general (1863). In 1865 he and his troops were forced to surrender to Grant. He became governor of Virginia (1885), and held consular and other appointments in Cuba (1896-1901), after which he retired to Virginia. He wrote a life of his uncle, *Robert E. Lee* (1894).

Lee, FREDERICK RICHARD (1799-1879), English landscape painter, was born at Barnstable. He is known as a clever exponent of English landscape and seascape. Among his works are *The Coast of Cornwall at the Land's End* and *The Plymouth Breakwater*. The National Gallery possesses four of his pictures, and there are other examples in S. Kensington Museum.

Lee, JAMES PARIS (1831-1904), joint-inventor of the Lee-Metford and Lee-Enfield rifles, was born at Hawick, Scotland, whence his parents emigrated (1836) to Galt, Ontario, Canada. The English War Office adopted the Lee-Metford (1888), which after a short time was replaced by the Lee-Enfield, and this is now giving way to the new short rifle.

Lee, ROBERT (1804-68), Scottish divine, was born at Tweedmouth. He held the charges of Airthro, Campsie, and the Old Greyfriars' Church, Edinburgh, and was appointed professor of Biblical criticism in Edinburgh University (1847). His name is associated with contests with the church authorities regarding so-called unlawful innovations in the service of the Church of Scotland, and the question of the publication of a service book was pending at the time of his death.

Lee, ROBERT EDWARD (1807-70), American soldier, the great general of the Southern states in the American civil war. He served his apprenticeship in arms at West Point, like most of the leaders in the war of 1861-5. He took part in the Mexican war (1845), and on the outbreak of the civil war Lee at once threw in his lot with that of his own state, Virginia, and was soon placed at the head of the Confederate armies. He did comparatively little in the campaign of 1861; but in that of 1862 he proved himself to be a great leader and a consummate soldier. His operations against McClellan around Petersburg and Richmond (1862) were distinguished for science, energy, and military resource. Lee then took the offensive and invaded Maryland. He retreated after an indecisive battle at Sharpsburg; but he completely defeated Burnside at Fredericksburg and Hooker at Chancellorsville.

In 1863 Lee again assumed the offensive, swept past Washington, and invaded Pennsylvania, placing the Northern government in a state of alarm. He fought a sanguinary battle at Gettysburg, but was defeated. This proved to be a turning-point in the war. Grant advanced to Richmond in the spring of 1864, and was defeated by Lee. Grant was, however, reinforced by Butler; then Richmond was invested, and Lee, who had entreated in vain that his army should be left free to act in the field, was practically cooped up within the Southern capital. In a fruitless attempt to escape from Richmond, Lee was surrounded and compelled to surrender, and the subjugation of the South was at once completed (1865). The veteran warrior survived until 1870, by no one more respected than by his distinguished adversary, General Grant, as one of the greatest soldiers of the 19th century. See Fitzhugh Lee's *General Lee* (1894), and R. E. Lee's *Recollections and Letters of General Lee* (1905).

LEE, SAMUEL (1783-1852), English Orientalist, born at Longnor, Shropshire. While learning a carpenter's trade he acquired a knowledge of Greek, Hebrew, and other languages. He entered Queen's College, Cambridge (1813), became professor of Arabic there (1819), and regius professor of Hebrew (1831). He published a *Hebrew Grammar* (1827), edited many texts of Oriental works, and prepared several editions of the Bible for the British and Foreign Bible Society.

LEE, SIDNEY (1839), English man of letters, born in London; educated at the City of London School and Balliol College, Oxford; assistant-editor and afterwards editor of *The Dictionary of National Biography*. In this work a number of important articles are from his pen, including those on 'Queen Victoria' and 'Shakespeare,' both of which he has published, in revised and enlarged editions, as books. He has also written a work on *Stratford-on-Avon* (1885), and another on *Great Englishmen of the 16th Century* (1904).

LEE, VERNON (1856), pseudonym of Violet Paget, English writer of fiction and aesthetic criticism. She was born in France, and has spent the greater part of her life in and near Florence. Her published works include *Studies of the Eighteenth Century in Italy* (1880); *Belcaro* (1881); *The Prince of the Hundred Soups* (1883); *Ottoline* (1884); *Euphorion* (1884); *The Countess of Albany* (1884); *Miss Brown* (1884); *A Phantom Lover* (1886); *Baldwin* (1886); *Juvenilia* (1887); *Hawtins* (1890); *Vanitas* (1892);

Althea (1893); *Renaissance Fancies and Studies* (1895); *Limbo* (1897); *Genius Loci* (1899); *Ariadne in Mantua* (1903); *Penelope Brandling* (1903); and *The Spirit of Rome* (1905).

LEE, WILLIAM (? d. 1610), English divine, and inventor of the stocking-frame machine. He was born at Calverton, Nottinghamshire, educated at Cambridge University, and was in the ministry at Calverton (1589). His ingenious apparatus having met with scant recognition, Lee emigrated to France, and successfully set up his frames at Rouen.

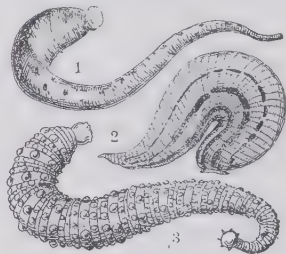
LEECH, JOHN (1817-64), English artist and caricaturist, born in London. At eighteen he revealed the bent of his genius in his *Etchings and Sketchings, by A. Pen, Esq.* (1835). These illustrated various phases and types of every-day London street life, humorously portrayed. The magazines of the period, such as *Once a Week*, *Bentley's Miscellany*, and other journals, also engaged his facile pencil; but it is through the pages of *Punch* that Leech is pre-eminently known. He joined the staff in 1841, and contributed singularly able drawings and political cartoons and skits until his death. He also illustrated A'Beckett's *Comic History of England* (1847-8) and *Comic History of Rome* (1852), and Hood's *Comic Annual*. His *Punch* drawings were republished as *Pictures of Life and Character* (1854-69) and *Pencilings from Punch* (1864-5). See Frith's *Life* (2 vols. 1891), and Brown's *John Leech* (1882).

LEECH. See NEPHELIUM.

Leeches are modified annelids, or ringed worms, adapted to a special method of life. A typical example is *Hirudo medicinalis*, one of the medicinal leeches, still used in blood-letting. It lives in fresh water, and while rare in this country, is not uncommon in Germany, Bohemia, and Russia. The diet consists of the blood of vertebrates, to which the leech attaches itself by its suckers. Of these, one is posterior and imperforate, the other anterior, with the mouth in the centre. Within the mouth lie three triangular tooth-plates, by means of which a small triradial incision is made in the skin of the animal attacked. This done, the leech proceeds to fill its crop, which extends almost from end to end of the body, and has eleven lateral pockets. When these have become distended with blood, the leech drops from its temporary host, and the slow process of digestion begins. Leeches usually move by attaching alternately the anterior and the posterior suckers, somewhat after the fashion of a 'looping caterpillar,' but they can

also swim by movements of the whole body. The eggs are laid in cocoons in damp earth.

Apart from the familiar medicinal leech, a number of other leeches occur, some in fresh water, some in salt, and some on land in damp places, twenty-one species being apparently British. The horse-leech (*Aulastomum*) feeds chiefly on earthworms and on other leeches; the skate-leech (*Pontobdella*) is very common on skates, rays, and sharks, and makes ugly wounds. To the genus *Hamadipsa* belong the land-leeches of the tropics, which, though of small size, are exceedingly voracious, and, on account of their numbers, even dangerous. Leeches vary much in size, for while some are as thin as a hair, certain of the marine forms reach a length of about one and a half feet.



Leeches.
1. Medicinal leech. 2. Horse leech.
3. Skate-leech.

Leeches were formerly associated by some authorities with the flat worms, but are now regarded as more closely connected with the earthworms. In one genus (*Branchellion*) well-developed gills are present, while in another (*Acanthobdella*) bristles are found. These facts are regarded as proving that the leeches are descended from bristle-bearing and gill-bearing forms. Leeches constitute the order Hirudinea or Discophora (sucker-bearing).

LEEDS, munic., parl., and co. bor., in the West Riding of Yorkshire, 31 m. w.s.w. of York, and an important railway centre on G.N., Lancs. and Yorks., Great Cent., Mid., N.E., and L. & N.W. Rys. It is situated on the Aire, by which it has water communication with the Humber, while the Leeds and Liverpool Canal connects it with the western seaboard. The town hall, with fine Corinthian columns, was opened by Queen Victoria in 1858. Other public buildings are the municipal offices (erected 1884), art gallery and museum, free library, county court, post office (1896), Royal Exchange, Corn Exchange, new Market Hall, and Coliseum. The Yorkshire College, constituted 1874, became in 1887 one of the constituent



Views in Leeds.

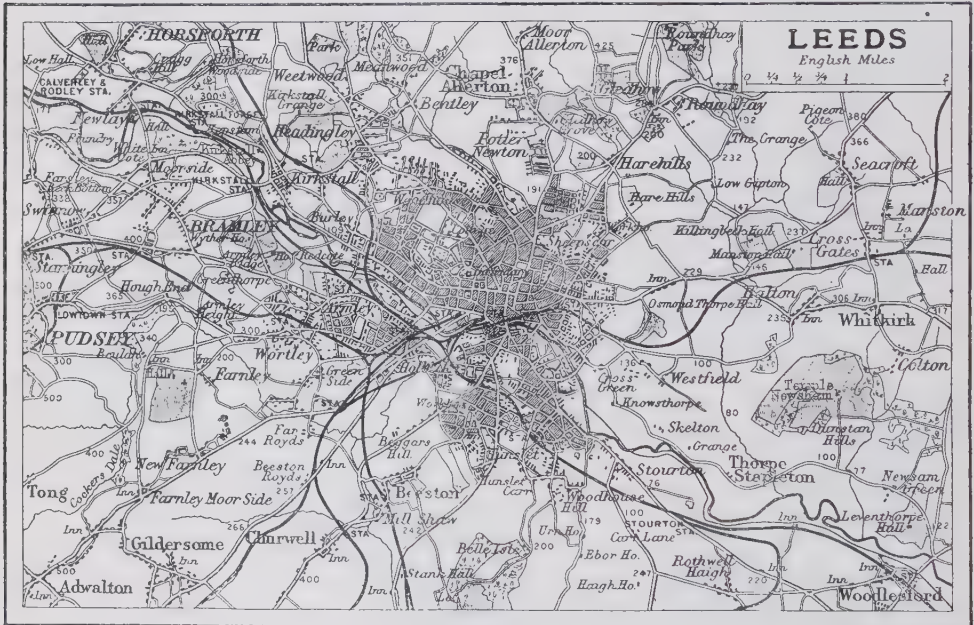
1. Town Hall. (Photo by Valentine.) 2. Kirkstall Abbey. (Photo by G. W. Wilson & Co.) 3. City Square. 4. Briggate. 5. Yorkshire College. (Photos by Valentine.)

colleges of the Victoria University, Manchester, and is now established as a self-contained university. It includes textile and art departments, founded by the Clothworkers' Company, affording practical instruction in the various branches of cloth manufacture. The university is attended by over 1,300 students, and has numerous scholarships. The medical department occupies a separate building. Kirkstall Abbey, $2\frac{1}{2}$ miles from the city, belonging to the corporation of Leeds, is probably the best preserved of English monastic houses, with the exception of Fountains Abbey. The borough returns five members to Parliament. Leeds is the chief centre of the wool-

Leeds, THOMAS OSBORNE, DUKE OF (1631-1712), English statesman, was the son of Sir E. Osborne, Bart. of Kiveton, Yorkshire, a prominent royalist. He became treasurer of England (1673), and Earl of Danby (1674); and laid Oates's plot before the House of Lords (1678). A zealous Protestant, in political life he is stated to have been 'greedy of wealth and honours, corrupt himself, and a corrupter of others.' Charles II. held him in high favour, and he acquired great power. Accused of intrigue and bribery, he was committed to the Tower, and remained there for nearly five years. At the revolution, declaring himself an adherent of William of Orange, he received

nine inches being left from plant to plant. Leeks require liberal applications of water. The blanching is effected by earthing up the stems as growth proceeds, care being taken not to bury the crowns. The leeks should be fit for use from September to March or April. The leek is the emblem of the Welshmen, worn on St. David's Day, March 1.

Leek, mrkt. tn., Staffordshire, England, near the Churnet, 10 m. N.E. of Burslem. Manufactures sewing silk, waterproof silk, braids, laces, and covered buttons. In the vicinity are the remains of Dieu le Cres Abbey, several ancient camps, and an earthen rampart. The town



len industry in England. This industry was established in the middle ages; but the modern development of Leeds dates from the introduction of steam-power machinery towards the close of the 18th century. Other large industries include locomotives, machinery, heavy iron and steel goods of all kinds, chemicals, glass, printing, leather goods, and pottery. During the civil war Leeds suffered severely, and many engagements took place in the surrounding district. Area, 21,596 ac. Pop. (1901) 428,968. See Taylor's *Churches of Leeds and Neighbourhood* (1875); Wardell's *Antiquities of Leeds* (1853); and Robinson's *Relics of Old Leeds* (1896).

promotion as president of the council and Duke of Leeds (1694); but in the following year he was again impeached on a money question, over which the inquiry was stopped. He afterwards retired into private life (1699). See his *Memoirs* (1710), and *Life by Courtenay* (1838).

Leek (*Allium porrum*), a liliaceous plant long cultivated for the lower part of its leaves, which form a thick succulent stem, much used in soups and stews, especially in French cookery. The wild plant grows in the east of Europe and adjacent countries of Asia. The seed should be sown in February, and the young plants should be planted out in deeply-dug and richly-manured soil,

charter was granted in 1208. Pop. (1901) 15,500.

Leeman's Acts, the name sometimes given to the Sale of Shares Act (1867) and the Borough Funds Act (1872). The former act provides that the number of each share must be inserted in all contracts for the sale of shares in joint-stock banking companies, while the latter act enables the costs of promoting and opposing private bills in Parliament to be charged on local and borough funds.

Leer, tn., Prussian prov. of Hanover, 14 m. S.E. of Emden; has brick works, iron foundries, distilleries, paper factories, and shipping trade. Pop. (1900) 12,301.

Lees, JAMES CAMERON (1834), Scottish divine, born in London. He became successively minister of Carnock, of Paisley Abbey, and of St. Giles's Parish, Edinburgh, which charge he has now held for many years. He is chaplain-in-ordinary to the King, and since 1887 has been Dean of the Order of the Thistle and of the Chapel Royal of Scotland. His chief works are, *History of the Abbey of Paisley* (1878), *History of St. Giles's* (1889), and *A History of the County of Inverness* (1897).

Leet. See COURT LEET. The word is also used in connection with elections or appointments to an office. A few persons, on one of whom the final choice is to fall, are selected from a large number of candidates, and the list is called a 'short leet.'

Leeuwarden, tn., Netherlands, cap. of prov. Friesland, 33 m. w. of Groningen; contains a Frisian museum, and a royal palace (1587-1747). It has manufactures of linens, musical instruments, vehicles, and glass, and large cattle and fruit markets. Pop. (1900) 32,162.

Leeuwenhoek, ANTON VAN (1632-1723), Dutch microscopist, who made an extraordinary number of discoveries with relatively very imperfect instruments. He lived and died at Delft, but was a member both of the Royal Society of London and of the Paris Academy of Sciences. Most of his observations are described in the former and the *Memoirs* of the latter body. He studied the circulation of the blood in the frog's foot, thus confirming Harvey's discovery; and made some detailed observations on rotifers, as well as studied a vast number of organic substances and tissues, such as ivory, hair, muscle, and the skin. He attempted to disprove spontaneous generation; and succeeded in proving the natural generation of weevils in wheat, of eels, of aphides, of mussels, and of some other forms, at that time supposed to rise *de novo* from inorganic substances.

Leeuwin, cape, s.w. point of Australia, 150 m. w. of King George's Sound; so named by Flinders after the Dutch ship which first sighted it in 1622.

Leeward Islands, groups of the Caribbean Is. They are divided into the presidencies of Antigua (including Barbuda), St. Kitts (with Nevis and Anguilla), Dominica, Montserrat, and the Virgin Is. They are under British rule, except St. Thomas, Santa Cruz, and St. John in the Virgin Is., which belong to Denmark. The islands are of volcanic origin, and contain some lofty peaks, the highest being the Morne Diablotin (5,314 ft.) in Dominica.

Off the west coast of this island Admiral Rodney gained a victory over the French. Sugar and molasses are the chief products; lime juice is exported from Montserrat. The total value of the imports (1904) was £377,700; that of the exports, £311,469. The areas and populations of the larger islands are:—Antigua, 108 sq. m.; pop., with Barbuda and

ory (1799); and to mark his successful operations at the siege of Danzig (1807), when that city surrendered to the French, he was created Duke of Danzig. He served in the Peninsular war, and throughout the Russian campaign (1812), and assisted in the defensive operations against the allied armies before the surrender of Paris.



Redonda, 35,073. St. Kitts, 65 sq. m.; pop. 29,782. Nevis, 50 sq. m.; pop. 12,774. Dominica, 291 sq. m.; pop. 28,894. Montserrat, 32 sq. m.; pop. 12,215. Total area of British islands, 701 sq. m.; pop. 127,434.

Lefebvre, FRANÇOIS JOSEPH, DUC DE DANTZICK (1755-1820), marshal of France, born at Rouffach, Alsace. He assisted Napoleon in overturning the Direct-

Lefebvre, JULES JOSEPH (1836), French painter; studied at Paris under Cogniet, and won the Prix de Rome (1861). He has distinguished himself especially as a painter of the nude, of which his allegorical picture of *Truth* in the Luxembourg is a good example. His style in his later works—e.g. *Lady Godiva* (1890), and *A Daughter of Eve* (1892)—has become somewhat modified.

Lefevre, GEORGE JOHN SHAW. See SHAW-LEFEVRE.

Leffler, ANNA CARLOTTA. See EDGREN.

Lefkosia. See NICOSIA.

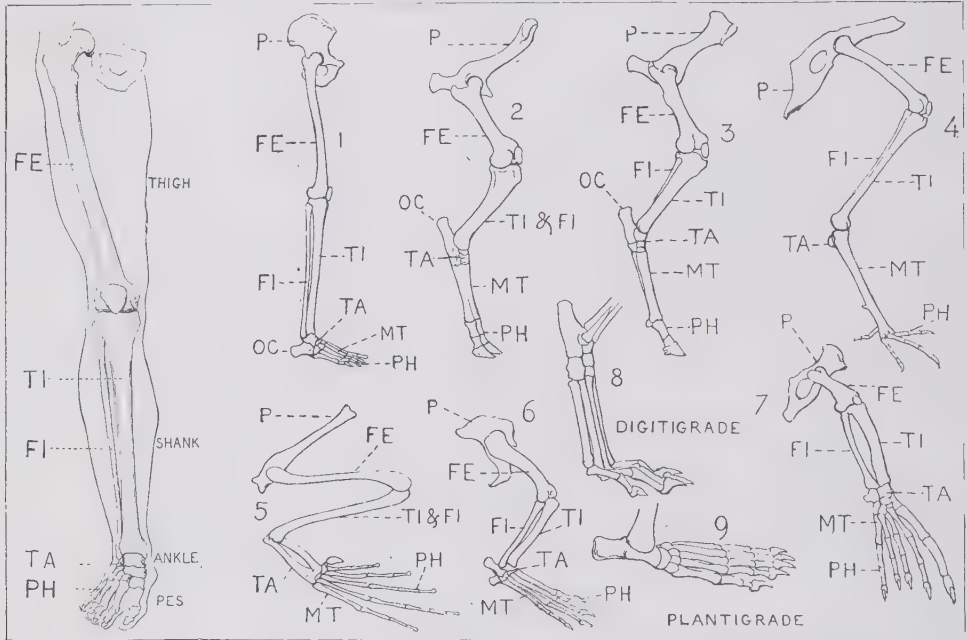
Lefort, FRANÇOIS (1656-99), Russian general, admiral, and statesman; born at Geneva, of Scottish stock. Lefort emigrated to Russia (1675), where he ultimately became the favourite of Peter the Great, in whose service he reconstituted the army and navy. See *Life* by Golikof.

Leg. All vertebrates above fishes have the limbs constructed on the same plan. Each limb is

cap, which lies in the tendon of the quadriceps extensor muscle, and articulates with the femoral condyles. The tibia, or shin bone, articulates with the femur above, and at its lower end with the astragalus, as well as laterally with the fibula. The fibula, or peroneal bone, lies externally to the tibia, and articulates with it at its upper end without entering into the formation of the knee joint. At its lower end the fibula articulates with the astragalus and with the tibia. Between the two long bones of the leg is stretched the strong per-

tibial, and peroneal, which are all branches or divisions of the popliteal artery. The chief veins are the anterior and posterior tibial and the internal and external saphenous. The chief nerves of the leg are the posterior tibial and the external saphenous. The nomenclature of arteries, veins, and nerves sufficiently indicates their position in the leg.

Legacy. A legacy is either (1) general—i.e. payable out of the residue of an estate; (2) demonstrative—i.e. primarily payable out of a specific fund, but if the fund is exhausted then out of



Human Leg, front view, and comparative diagrams showing modifications of the leg.

1, Man; 2, ox; 3, horse; 4, bird; 5, frog; 6, crocodile; 7, seal; 8, dog; 9, bear. P, pelvis; FE, femur; TI, tibia; FI, fibula; TA, tarsus; MT, metatarsus; PH, phalanges; OC, os calcis.

divided into four parts, named as follows in fore and hind limb respectively: upper arm (brachium), fore arm (antibrachium), wrist (carpus), and hand (manus); thigh (femur), shank (crus), ankle (tarsus), and foot (pes). The upper segment of both limbs contains a single bone, known as humerus and femur respectively; but the next segment primitively contains two, the radius and ulna in the fore arm, and the tibia and fibula in the shank. There are never more than five complete digits, but in amphibians and some reptiles traces of extra digits may be observed.

In human anatomy the leg—i.e. the crus or shank—contains a third bone, the patella or knee-

bone, which with the bones affords attachment to the muscles of the calf. At the upper end of the tibia is inserted the ligamentum patellæ, or tendon of the quadriceps extensor muscle, which straightens the limb. Behind are attached the hamstring tendons. The chief muscles arising from the anterior aspect of the leg flex the ankle and extend the toes, while those on the posterior aspect have the opposite effect. The superficial muscles of the calf, the gastrocnemius and soleus, have a common tendon, the tendo Achillis, which is inserted into the os calcis, or heel bone. The arteries of the leg are the anterior tibial, posterior

tibial, and peroneal, which are all branches or divisions of the popliteal artery. The chief veins are the anterior and posterior tibial and the internal and external saphenous. The chief nerves of the leg are the posterior tibial and the external saphenous. The nomenclature of arteries, veins, and nerves sufficiently indicates their position in the leg. A legacy is either (1) general—i.e. payable out of the residue of an estate; (2) demonstrative—i.e. primarily payable out of a specific fund, but if the fund is exhausted then out of

amount, and given in the same will, the presumption is that one is a repetition of the other; but if they are unequal, or in different instruments, the presumption is that one is in addition to the other. There is sometimes, however, internal evidence that one is in substitution for the other. If a legatee is indebted to the testator, the executors may set off the legacy, unless it is specific, against the debt. If the testator is indebted to the legatee, the presumption is that the legacy is in payment of the debt; but this presumption is easily rebutted—for example, by showing that the legacy is less than the debt. Under Locke King's Act, 1854, a devise of land subject to a mortgage *prima facie* takes the land with the mortgage, and is not entitled to have the mortgage paid off out of the general estate. A legatee, in the absence of directions to the contrary, is entitled to a legacy within one year of the testator's death, and to interest at four per cent. from that time. An annuity runs from the day of the testator's death. A legacy to an executor is, *prima facie*, conditional upon acceptance of the executorship. See LAPSE, ABATEMENT, DEATH DUTIES, and ELECTION. See also Jarman *On Wills* (5th ed. 1893), and Theobald *On Wills* (6th ed. 1905).

Legal Education, COUNCIL OF. The Council of Legal Education is an unincorporated body consisting of delegates appointed by each of the four Inns of Court (Lincoln's Inn, the Inner and Middle Temples, and Gray's Inn), from among its benchers, five being appointed by each inn. The council was established in 1852, and is entrusted with the power and duty of superintending the education and examination of students, and granting certificates of fitness for call to the bar. The council appoints a Board of Studies, and readers and assistant readers in (1) Roman law and jurisprudence and international law; (2) constitutional law and legal history; (3) evidence, procedure, and criminal law; (4) the law of real and personal property and conveyancing; (5) common law; and (6) equity. These deliver lectures and hold classes which are open to all members of the several Inns of Court, and also to non-members upon payment of fees. Examinations are held four times a year, and no student can be called to the bar by his inn until he has received pass certificates in all the above-named subjects from the council. The council publishes an annual *Calendar*, containing information as to the admission of students, lectures, examinations, and call to the bar.

Legal Fiction. See FICTION, LEGAL.

Le Gallienne, RICHARD (1866), English author and journalist, was educated at Liverpool College, and after some years' training as an accountant, became literary secretary to Wilson Barrett (1889). Appointed literary critic to the *Star* (1891), he was afterwards connected with the *Daily Chronicle* and the *Speaker*, while he has contributed frequently to the *Nineteenth Century* and other periodicals. Among his works are *Volumes in Folio* (1888), *George Meredith: some Characteristics* (1889); *The Book Bills of Narcissus* (1891); *English Poems* (1892); *The Religion of a Literary Man* (1893); *Robert Louis Stevenson, and other Poems* (1895); *The Quest of the Golden Girl* (1896); *The Life Romantic* (1900); and *An Old Country House* (1902).

Legal Tender. See TENDER.

Legato, a term in music signifying that the passage must be played very smoothly, the notes succeeding each other with the least possible break.

Legazpe, or LEGASPI, MIGUEL LOPEZ (c. 1510-72), Spanish soldier, who led the Spanish expedition for the conquest of the Philippines (1564). This he successfully accomplished, and founded Manila (1571), naming the island group after the Spanish king, Philip II.

Legend was at first applied to written chronicles, or narratives, especially those of the mediæval church. What was pre-eminently known as 'The Legend' was the 13th-century compilation of the lives of saints, by Jacobus de Voragine, archbishop of Genoa, more popularly spoken of as 'The Golden Legend,' or *Legenda Aurea*. *The Legend of the Three Kings* was a religious drama or miracle play, of which the earliest MS. appears to belong to the 11th century. The term 'legend' was also applied to any inscription or motto, as it still is by numismatists. Thus, the word was primarily used to denote something read, and it is in this original sense of a written narrative that Scott employs the word in his *Legend of Montrose*, although doubtless keeping in view its later meaning.

As understood at the present day, legends are popular traditions current among uneducated people in civilized countries, or constituting the unwritten history and mythology of primitive races, inherited from a remote past. Legend, indeed, is the basis of the history of all nations, and in many cases it is difficult to draw the line between legend and true history. Oral traditions have a certain value; more particularly when they have been

preserved by a specially trained caste, such as that once existing among the Celtic nations, who carefully passed on the records of the national life from one generation to another. Consequently, the 'legendary period' of a country has its historical aspect; and one cannot absolutely dismiss as non-historical such legendary accounts as the Scandinavian *Sagas* and *Eddas*, the Finnish *Kalevala*, the Teutonic *Heldenbuch* and *Nibelungenlied*, the *Nihongi* of the Japanese, and many doubtful passages in Sanskrit, Persian, Greek, Roman, and Hebrew chronicles. Besides containing a certain amount of historical truth, legendary lore further embodies much of the religious faith of a people. Of recent years there has been a growing recognition of the importance of these inherited beliefs, which, under the modern name of folklore, are studied by scholars of all nations. One result already apparent is that there is an inter-relation between the legends of races widely separated alike by time and by distance. See FOLKLORE.

Legendre, ADRIEN MARIE (1752-1833), French mathematician, born at Toulouse, went to Paris, and after attracting the notice of D'Alembert, obtained the chair of mathematics at the military school. For his excellent paper on *L'Attraction des Ellipsoïdes*, Legendre was in 1783 admitted member of the Académie des Sciences, and appointed to the Bureau des Longitudes. In his *Nouvelles Méthodes pour la Détermination des Orbites des Comètes* (1806) he invented the rule of the 'least square of errors,' a mathematical device which has since become familiar. His *Éléments de Géométrie* (1794) is well known, especially in France. His greatest work, *Traité des Fonctions Elliptiques* only appeared in 1825-32.

Legge, JAMES (1815-97), English sinologist, born at Huntly, Aberdeenshire; was sent by the London Missionary Society to the East (1839), being stationed at Malacca, and afterwards for many years at Hong-kong. He achieved world-wide reputation through his writings on China, particularly by his edition of the Chinese classics, begun in 1841, and finished shortly before his death. He was appointed professor of Chinese language and literature at Oxford (1876). His other works include *The Notions of the Chinese concerning God and Spirits* (1852); *Life and Teaching of Confucius* (1867); *The Religions of China* (1880); and *Record of Buddhistic Kingdoms* (1886). See *Life* by his daughter (1905).

Leghorn (It. *Livorno*; anc. *Labronis*), fort. seapt. and city, prov. Leghorn, Tuscany, Italy, on the coast of the Tyrrhenian Sea, 12 m. s. w. of Pisa; is situated on a low and somewhat marshy plain. In the 11th century it came into the hands of Pisa. Towards the close of the 14th century it was taken by Visconti of Milan. The French occupied it from 1404 to 1407. From the latter date it belonged to the Genoese, who in 1421 sold it to the republic of Florence. In that year there were only 1,200 inhabitants. Much of its prosperity, which dates from 1421, was due to the energy and enterprise of the Medicean grand-dukes, who, recognizing the value of its situation, largely extended and beautified the town. In 1541 it was connected by a canal with the Arno at Pisa. In 1605 it was proclaimed a city, and strongly fortified. Its harbour was constructed between 1587 and 1621, and the city was declared a free port by Cosimo I. In 1855 a double harbour was constructed. The harbour is protected by a mole over half a mile long, with a lighthouse at each end. It exports hemp, hides, marble, olive oil, coral, candied fruit, wine, soap, boracic acid, and hats; and imports coal, fish, tobacco, wheat, and raw hides. Forty per cent. of the trade is with Britain. Shipbuilding, glassmaking, copper and brass founding, are the principal industries. It is the seat of a bishop, and has a beautiful 17th-century cathedral and a large naval academy. On March 4, 1653, a naval battle with the Dutch was fought in the roads. Pop. (1901) 98,321.

Legion, in Latin *legio*, was the name of the divisional unit of a Roman army. The number of soldiers contained in a legion varied at different epochs, from 3,000 under the early kings, 4,200 after the time of Servius Tullius, 5,000 during the second Punic war, to 6,000 after the time of Marius (100 B.C.); 300 cavalry also were attached to each legion. Before Marius each legion was divided into thirty maniples; he introduced a new division into ten cohorts, and also gave each legion a silver eagle as a regimental standard. In republican times four legions were an ordinary yearly levy; at the death of Augustus, in 14 A.D., the regular standing army consisted of twenty-five legions.

Legion of Honour, French order of merit, created in 1802 by Napoleon, when first consul, with the view of specially marking exploits and services in the military and civil departments. Napoleon himself was first grand master. Its present constitution

comprises Knights Grands Croix, Grands Officiers, Commandeurs, Officiers, and Chevaliers, the number of the latter being unlimited. The head of the republic is the grand chancellor of the order. The decoration at present is a star of five double rays, with wreath of oak and laurel. On the obverse appears the female head personifying France, and the words, 'République Française'; on the reverse, two tricolors, and the motto, 'Honneur et Patrie.'



Cross of the Legion of Honour.

Legislation, THE SOCIETY OF COMPARATIVE. This society was formed in England in 1894 to promote the comparative study of law, by collecting evidence as to how the numerous legislatures of the world deal with the same subjects. The objects of the society are both practical and scientific, and special attention is paid to the laws which are in their effects international—e.g. mercantile law. The society publishes *The Journal of Comparative Legislation*.

Legislation and Legislative Processes. Legislation may be defined as the enunciation of general rules of conduct in express terms.

The process through which every complete legislative act or statute must necessarily pass may be analyzed into the three stages of proposal, criticism, and acceptance.

The power of proposing or initiating legislation is more important than it might at first view seem. The framer of a motion generally has a powerful influence over its character and scope. At the least he obtains most of the credit if the result

is successful, while he divides the obloquy if it is a failure. Accordingly, we notice that the right of proposing legislation is often jealously guarded. In most of the states of the ancient world it could be exercised only by a magistrate. In ancient times a change in the law was looked upon as a rare expedient of doubtful piety, which could not safely be left to lay enterprise. In modern days similar restrictions have existed, and still exist. In the early constitutions of the Australian colonies no one was allowed to propose legislation but the governor. The same rule, it is believed, prevails at the present day in the smaller crown colonies of the British empire. Before the appearance of representative assemblies in medieval Europe, the kings jealously reserved to themselves the prerogative of proposal. The duty of the feudal assembly was to give advice when asked, not to dictate the policy of its suzerain. In Russia, until 1711, the right to propose legislation was with the Czar alone; even now its exercise is jealously confined to the senate and the ministers. The demand by the Finnish Estates of the right to initiate legislation in their own Diet was one of the steps which provoked the suspension of the constitution. The Irish Parliament during the existence of Poyning's Act, the Convocations of Canterbury and York since the reformation, are well-known examples of legislative bodies having no power to initiate legislation. The parliamentary right of proposing legislation came in through the side path of petitioning. Petitions by individuals or small communities to government authorities are frequent in all stages of political organization; and few rulers are so brutal and so unmindful of their own interests as to prohibit them. But these petitions are, in the vast majority of cases, of a purely personal character, and a favourable response produces merely an executive order. It was only when the practice of petitioning was taken up by the representative bodies that the right of initiating legislation was extended.

The period of criticism and discussion is the next stage in the process of legislation. This right has, at different times, been exercised by different authorities. The intensely democratic character of the Athenian constitution is evinced by the curious process known as *nomothesia*, by which the question of revision and amendment was discussed by advocates for and against the existing law before a body of *heliasts* or jurors. But this was

at a very advanced stage of Athenian politics. As a general rule, no discussion took place in the popular assemblies of the ancient world. Measures submitted to them had been carefully considered by an aristocratic body, a *boule* or senate; and the function of the assembly was to say 'yes' or 'no.' Such was the character of the early assemblies of the Teutonic kingdoms, and even, it can hardly be doubted, of the earliest representative parliaments of mediæval Europe. That famous Scottish institution, the Lords of the Articles, is sometimes looked upon as an encroachment on the popular right of discussion. It is equally likely to have been a compromise between the growth of parliamentary ambition and the conservative attitude of the crown.

After the stage of criticism and discussion has been passed, and the measure is ready for completion, it not infrequently happens that the formal assent of some external authority has to be obtained, in order to render it binding. This is more especially the case when the proposal and framing of the measure have been the work of a representative body, as in the examples of the Parliaments of Western Europe and Australia, and the Congress of the American republic. But it has also happened in bureaucratic systems, such as the French monarchy of the 17th and 18th centuries, when the *parlements* or supreme law courts of France claimed the right to register, or to refuse to register, the royal edicts; and a similar provision may be found in some of the earlier Australian constitutions, in which enrolment by the chief-justice was a necessary preliminary to the enforcement of an ordinance. Usually the right of acceptance involves the unlimited right of rejection; but the president of the United States, and the governors of the respective states, although in most cases vested with the so-called 'veto,' cannot maintain it against the determined resolution of the houses expressed by substantial majorities. The most novel, and in some respects important, form of the accepting power is that practised regularly in Switzerland, and rarely (and only on certain questions) in France and the United States, known as the *referendum*. By this practice the consent of the electors to a measure framed by the legislature is directly asked, and on their answer depends, of course, the entire fate of the measure. The referendum, it should be noticed, is regularly practised in England in local matters.

Hardly less important than the proper wording of a statute is the publicity with which its terms are announced. In any given country the persons actively interested in politics and legislation are comparatively few. Once the right of parliamentary discussion is secured, these persons have little difficulty in following the course of legislation. But all are interested in obeying the laws; and to assume that all persons will follow the course of debates in Parliament or the press is to make a somewhat excessive demand on ordinary human nature. Accordingly, enlightened reformers have begun to urge, hitherto without much success, that a machinery for bringing home the actual provisions of legislation to the public is greatly to be desired.

In conclusion, it may be noticed that the growth of public business in representative assemblies has led to the development of an important system of indirect legislation. Parliaments are now content, in many cases, to lay down general provisions, leaving the special application of them to smaller or less-occupied bodies. In Britain, nothing is clearer testimony to the confidence in the executive produced by popular government than the willingness which Parliament has recently shown, when passing important statutes, to leave the detailed application of them to the crown in council, to public boards and committees, and even to individual ministers. The Elementary Education Acts, the Judicature Acts, the Public Health Acts, are striking examples of this policy. Under due safeguards, this practice tends to economize the time of Parliament, as well as to render legislation more practical.

See Bryce's *Studies in History and Jurisprudence* (1901); Ilbert's *Legislative Methods and Forms* (1901); Gilbert's *Constitutional Antiquities of Sparta and Athens* (1895); Lowell's *Governments and Parties in Continental Europe* (1896); Adams and Cunningham's *The Swiss Confederation* (1889); Bryce's *American Commonwealth* (3rd ed. 1893-5).

Legislature. The legislature is the law-making authority of a country or state. The highest form of legislature is exemplified by the Parliament of the United Kingdom. The King in Parliament—i.e. the King acting by and with the advice and consent of the Lords Spiritual and Temporal and Commons in Parliament assembled—can make or unmake any law whatsoever, including laws which alter the constitution of the realm. Parliament is therefore said to be a

sovereign legislature, or to be at once a legislative and constituent assembly. In countries such as France and Belgium the power of the legislature is limited by the constitution, and is therefore not sovereign. This subordinate character of a legislature is still more apparent in the case of the British colonies, for the powers of their legislatures are limited and defined by general or special statutes of the Imperial Parliament, and might be altered by the same authority. Many bodies not called legislatures have minor legislative powers, which vary in extent and importance from the large and important powers of such a body as the Legislative Council of India down to the mere power of making by-laws possessed by a municipal corporation or a railway company. See Dicey's *Law of the Constitution* (9th ed. 1902), and Todd's *Parliamentary Government in the British Colonies* (2nd ed. 1904).

Legitim is the share of movable property which, by the law of Scotland, passes on the death of a father or mother to the children, and is equally divided among them. If there be a surviving parent, the share amounts to a third of the movables; otherwise it is a half. The right may be extinguished by antenuptial contract, or by the child's own act. In the latter case, known as *foris-familiation*, the right passes to the other children, if any.

Legitimacy. A child born in wedlock in England is presumed to be legitimate in the absence of evidence to the contrary. The peculiar difficulty of the subject of legitimacy is that a man may be legitimate for one purpose and not for another. But the question may be determined by the following rules:—(1.) For the purpose of intestate succession to immovable property in England a man must be legitimate by the law of England. Thus, a child born out of wedlock, and legitimated by the subsequent marriage of his parents, who are domiciled in Scotland, cannot succeed to real estate in England. (2.) For the purpose of intestate succession to movable property in England a person must be legitimate by the law of his domicile; and a child born of parents domiciled in Scotland at the date of the birth, but in England at the date of the marriage, is illegitimate for this purpose in England. (3.) In any event, and this is so far an exception to Rule 2, English law refuses to recognize the legitimacy of children for purposes of intestate succession, if that legitimacy is repugnant to English morality. The law of ancient Egypt approved of marriages between brothers and sisters. The

children of such a marriage, even though the place of domicile was Egypt, could not be regarded as legitimate in England; but they might be included under the term 'children' in a will, by English law. (4.) As to the practice of foreign countries, a distinction must be drawn between statutes which declare a child legitimate and those which declare that he may succeed on intestacy to his parents' estate: for example, in Italy an illegitimate child, if recognized by the father, may succeed to the estate on intestacy, but he is not therefore legitimate either by the law of England or that of Italy. In Scotland a child is legitimated by the subsequent marriage of his parents, provided there was no legal obstacle to such marriage at the date of birth, or perhaps conception. A change of domicile between birth and marriage does not affect this principle. A child may also be legitimated by royal letters of legitimation, which are now almost obsolete. See **MARRIAGE** and **DOMICILE**; also Foote's *Private International Jurisprudence* (3rd ed. 1904); and for Scotland, Fraser's *Parent and Child* (1866).

Legitimists, **THE**. After the overthrow of the Bourbon monarchy in 1830, and the accession of the Orleanist Louis Philippe, a party arose which favoured the return of the Bourbons. The revolution of 1848, however, placed Napoleon III. at the head of affairs; but on his fall (1871) the hopes of the Legitimists were raised. The Comte de Chambord, grandson of Charles X., was their head, and they counted upon the support of Marshal MacMahon and the reaction against communism; but the comte had not the gifts of a leader, and ruined his chances by obstinacy and want of tact. See **BOURBONS**.

Legnago, fort. tn., prov. Verona, Lombardy, Italy, on the Adige, 29 m. E. of Mantua; was one of the four fortresses of the Quadrilateral. Its fortifications were dismantled by Napoleon in 1801, but it was refortified by the Austrians in 1815. Pop. of comm. (1901) 14,529.

Legnano, tn., prov. Milan, Lombardy, Italy, on Olona R., 17 m. N.W. of Milan. Manufactures cotton, silk, thread, and machinery. Pop. about 8,000.

Legouve, **ERNEST** (1807-1903), French dramatist and author, attracted attention by his *Histoire Morale des Femmes* (1849) and *La Femme en France au XIX Siècle* (1864), followed by *La Science de la Famille* (1867) and *Messieurs les Enfants* (1868). Among his dramatic pieces are *Adrienne Lecouvreur* (written with Scribe, 1849); *Bataille de Dames* (also written with Scribe, 1851); *Médée*

(1856); *Les deux Reines de France* (1865); and *La Considération* (1880). More works on domestic questions were followed by *Soixante Ans de Souvenirs* (1886-7).

Legros, **ALPHONSE** (1837), French painter, etcher, and sculptor, born at Dijon. He was naturalized in England, and for seventeen years was Slade professor of art at University College, London, succeeding Poynter in the office. His paintings are characterized by austerity of style, synthetic treatment, and masterly draughtsmanship. The Manchester and Tate Galleries have good examples of his art.

Legume, the name given to the fruit of plants belonging to the Leguminosæ. It consists of a solitary two-valved carpel, bearing its seeds along the ventral suture. It dehisces by dorsal and ventral sutures, or by either.

Legumin, or **VEGETABLE CASEIN**, is an albumin which occurs in the seeds of leguminous plants. It can be coagulated by acids, redissolves in alkalis, and so closely resembles the casein of milk that a kind of cheese is prepared in Japan from an extract containing it obtained from the soy bean.

Leguminosæ, a natural order of plants containing an enormous number of species, including some of our most beautiful flowering plants, and also some plants of great economic value. The flowers have a five-cleft calyx, and usually five petals, of which the upper one, or standard, is the largest, the two lower ones forming a keel, and the two side ones wings. From their general resemblance to butterflies the flowers are said to be papilionaceous. There are ten stamens, either united so as to form a tube, or arranged in two bundles of nine and one. The pea, bean, vetch, whin, broom, trefail, and sainfoin are well-known species.

Legya, or **LAIHKA**, state in the E. of the Southern Shan States, Burma, consists for the most part of a plateau. It is watered by the Nam Long R., and produces rice, cotton, and sugarcane. Area, 1,433 sq. m. Pop. about 9,000. The capital, Laihka, 129 m. S.E. of Mandalay, manufactures iron and lacquer ware.

Leh, tn., Kashmir, India, cap. of Ladakh, is a walled city, 2 m. from the r. bk. of the Indus, about 210 m. N. of Simla. The town stands in an open valley, about 11,500 ft. above sea-level. Leh is the starting-point of the caravan routes into the Pamirs and Tibet, and commands the entrances to the several passes to its N. and E. It is the headquarters of a British political officer. Chief export, shawl wool. Pop. about 12,000.

Lehe, comm. in the Prussian prov. of Hanover, 2 m. N. of Bremerhaven, with market-gardening, brick-making, saw-milling, and flour-milling. Pop. (1900) 24,301.

Lehigh, riv., Pennsylvania, U.S.A., rises 2 m. E. of Wilkes-barre, flows S.E., and after a course of 120 m. falls into the Delaware at Easton. It passes through a district rich in anthracite coal.

Lehmann, **RUDOLPH** (1819-1905), German painter, born near Hamburg. After a sojourn in Rome he settled in London (1866), and speedily became popular as a portrait painter. Among his best-known pictures, apart from portraits, are *Sixtus v. blessing the Pontine Marshes*, in the museum at Lille, and *Early Dawn on the Pontine Marshes*. He has published *An Artist's Reminiscences* (1894), and *Men and Women of the Century* (1896).

Lehmann, **RUDOLF CHAMBERS** (1856), is better known probably as the 'coach' of the Oxford University crew for many years past than either as a journalist or as the writer of light, graceful verse. He joined the staff of *Punch* in 1890, and still contributes to its pages. His published works include *Harry Fludger at Cambridge* (1890); *In Cambridge Courts* (1891); *The Billsbury Election* (1892); *Mr. Punch's Prize Novels* (1893); *Rowing*, in Isthmian Library (1897); *Adventures of Picklock Holes* (1901); and *Crumbs of Pity* (1903).

Leibniz, **GOTTFRIED WILHELM**, **FREIHERR VON** (1646-1716), German philosopher, born at Leipzig; was of Bohemian descent, the son of a professor of philosophy in the University of Leipzig. He was educated at the universities of Leipzig and Jena, and received a doctorate in law from the University of Altdorf, where he declined the offer of a professorship. After leaving Nuremberg, he entered the service of the elector and archbishop of Mainz (then the most powerful man in the empire). In 1672 Leibniz went to Paris, where, in the course of a four years' residence, he had much friendly intercourse with Arnauld, Huygens, Malebranche, and other leading mathematicians and philosophers of the time, and made a profound study of mathematics, which ultimately bore fruit in his discovery of the *Differential Calculus* in 1676 (published 1684). Newton was in possession of a similar method as early as 1665 (published in 1693); and as Leibniz, early in 1673, visited London, where he had many scientific discussions with Oldenburg (secretary of the Royal Society), Robert Boyle, and others, it was for a long time

maintained by English scientists that Leibniz plagiarized the great discovery of Newton. There is, however, nothing to confirm this, and it is much more probable that each discovered the method independently. The form which Leibniz gave to the calculus, and the names and the signs which he used, have come to be universally employed in preference to those of Newton. In 1676 Leibniz became librarian to the Duke of Brunswick at Hanover, a post which he held for the remainder of his life. During the Hanover period of his life, Leibniz did most of the work which earned for him the name of 'the greatest polymathist since Aristotle.' He developed his system of metaphysics, which, however, he did not formally publish, but indicated in occasional papers for scientific journals, and in correspondence with other thinkers. He wrote the one book of his which was published in his lifetime, the *Théodicée*, a work of great learning, intended to maintain against the arguments of Bayle (of *Dictionnaire* fame) the harmony of faith and reason, and to 'vindicate the ways of God to man.' He wrote the *Nouveaux Essais sur l'Entendement Humain*, a long dialogue in which he discussed Locke's *Essay* chapter by chapter. He died unhonoured by his contemporaries, and it was only in later times that his greatness came to be fully appreciated.

Perhaps the dominant feature of Leibniz's thinking was the effort to incorporate in his philosophy the best elements of earlier thought. He maintained that on the whole the philosophers of the past had been right in what they affirmed, wrong in what they denied. More particularly he endeavoured, in his doctrine of substance (his *Monadology*), to reconcile or combine the principles of the Cartesian philosophy with the Aristotelian tradition of the scholastics. Plato, however, was his favourite philosopher among the ancients, and under Plato's inspiration he endeavoured to establish the metaphysical priority of final to mechanical causes in the interpretation of the universe. This is the secret of his doctrine, that the universe is ultimately a system of monads or spiritual automata, each being (in dependence only upon God) the cause of all the phenomena which make up its life, each reflecting ('mirroring'), with more or less clearness, the whole universe, and all thus agreeing in a 'pre-established harmony,' which explains the unity of the world, in spite of the diversity which might seem inevitably to result from the per-

fect spontaneity of each of the monads, its elements. Against Locke he maintained that ideas are at once innate and, in a sense, *a posteriori*; and in some of his speculations he anticipated to a certain extent the ideas of Kant. In his *Théodicée* Leibniz endeavoured to explain the evil of the world by the theory that it arises from the inevitable imperfections of creatures in a system which is not absolutely perfect, but which is 'the best of all possible worlds.' The influence of Leibniz upon later thought has been great, and is especially marked in the philosophies of Herbart, Lotze, and Renouvier. Leibniz was also the first to draw attention to the psychological importance of unconscious or subconscious mental processes; and some of his suggestions on biological and physiological questions have been singularly fruitful. Nearly all the chief sciences or branches of learning owe something to his wide curiosity and his pregnant reflection.

Bibliography.—Editions: *G. W. Leibniz Opera omnia nunc primum collecta*, ed. by Ludovici Dutens (6 vols. 1768). Philosophical works: *Die Philosophischen Schriften von G. W. Leibniz* (7 vols. 1875-90), ed. by Gerhardt; *Opera Philosophica*, ed. by Erdmann (2 vols. 1840); *Œuvres de Leibniz* (2 vols. 1846), ed. by Jacques; *Œuvres philosophiques de Leibniz, avec Introductions*, ed. by Janet (2 vols. 1866); *Rechtsphilosophisches aus Leibnizens ungedruckten Schriften*, ed. by Mollat (1885). Mathematical works: *Leibnizens Mathematische Schriften* (7 vols. 1850-63), ed. by Gerhardt. Historical and political works: *Die Werke von Leibniz* (10 vols. 1864-77), ed. by Klopp; *Œuvres de Leibniz* (7 vols. 1859-75), ed. by Foucher de Careil. Biography: Guhrauer's *G. W. F. Leibniz* (1846). Expositions, translations, commentaries: Boutroux's *La Monadologie de Leibniz*; Pichler's *Die Theologie des Leibniz* (1869); Nolen's *La Critique de Kant et la Métaphysique de Leibniz* (1875); Nourisson's *La Philosophie de Leibniz* (1860); Bouillier's *Histoire de la Philosophie Cartésienne* (1854); Fischer's *Leibniz's Leben, Schriften und Lehre* (3rd ed. 1899); Stein's *Leibniz and Spinoza* (1890); Merz's *Leibniz* (Blackwood's Philosophical Classics, 1886); R. Latta's *Leibniz: The Monadology and other Philosophical Writings* (1898); Russell's *A Critical Exposition of the Philosophy of Leibniz* (1900); Couturat's *La Logique de Leibniz* (1901); and Dillmann's *Eine Neue Darstellung der Leibnizischen Monadentheorie* (1891).

Leicester (Sax. *Legerceastre*), munic., co., and parl. bor., in Leicestershire, England, on the Soar, 27 m. s. of Nottingham. Several churches are ancient, that of St. Nicholas being the oldest. Trinity Hospital, founded 1330, and Wyggeston's, 1513, are richly endowed benevolent institutions. The principal manufactures are worsted hosiery, boots and shoes, elastic web, and agricultural implements. The town occupies the site of the Roman *Ratae*. Leicester was one of the 'five burghs' of the Danes. A castle erected here early in the 12th century, on the site of an earlier fortress, became afterwards a residence of John of Gaunt. Two gateways and the great hall of the castle still remain, also a part of the Jewry wall, and ruins of an Augustinian abbey. Leicester returns two members to Parliament. Pop. (1901) 211,581.

Leicester, ROBERT DUDLEY, EARL OF (?1532-88), favourite of Queen Elizabeth, was fifth son of the Duke of Northumberland. Introduced to court life at an early age, he was the companion of Edward VI. and Princess Elizabeth, and in 1550 married the ill-fated Amy Robsart. On Edward's decease he promoted the claims of his sister-in-law, Lady Jane Grey, as queen, was brought to trial, but ultimately pardoned. With Elizabeth's accession his influence increased. Of gracious presence, a skilled courtier, and held in high favour by the queen, he was regarded as her lover. He was created an earl in 1564. See *Leicester's Commonwealth*, ed. by Burgoyne (1904), and Bekker's *Elizabeth and Leicester* (1890).

Leicester of Holkham, THOMAS WILLIAM COKE, EARL OF (1752-1842), English agriculturist. A zealous Whig and a staunch supporter of Fox, he represented Norfolk from 1776 to 1833. Coke consistently upheld rural and agricultural interests, advocating improved methods of farming, particularly in wheat-growing and in the breeding of cattle. He was raised to the peerage in 1837.

Leicestershire, inland co. of England, in the Midlands. The surface is varied, valleys and plains alternating with low hills, commonly of gentle slope, rugged in the Wolds of the N.E. and in Charnwood Forest (long deforested), where is Bardon Hill, 853 ft. The principal rivers are the Soar, with Wreak and other tributaries, draining the centre; Trent in N.W., forming part of the N. boundary; and Avon and Welland in S.E. Cattle and sheep are reared, and the county has long been noted for wool and cheese (Stilton). Oats, wheat,

turnips, and mangold are the principal crops. Coal and iron are extensively worked, the former in the N.W.; granite and slate are quarried in Charnwood, lime near Barrow-on-Soar, and clay in various parts. Manufactures include hosiery (Leicester, Loughborough, Hinckley), boots and shoes, silk plush, elastic web, bricks, and pottery. Melton Mowbray, Market Harborough, and Loughborough are famous hunting centres. The county is divided into six 'hundreds,' and returns four members to Parliament. During the civil war

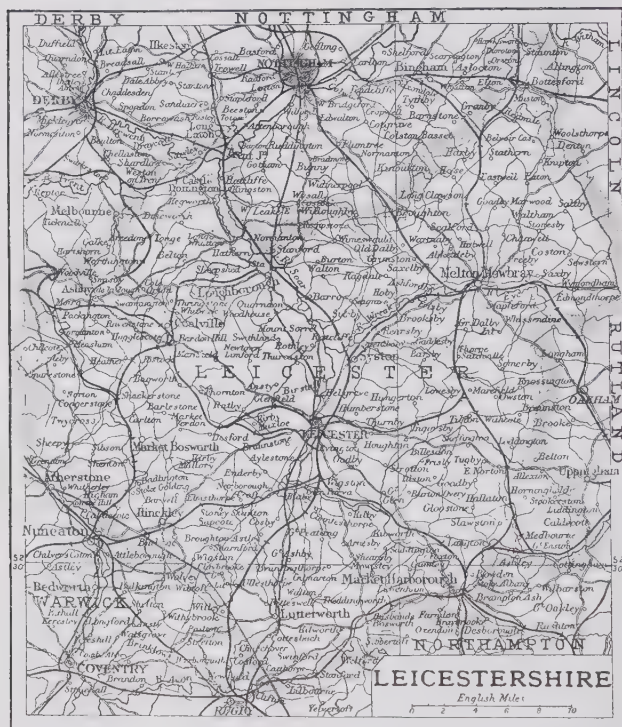
Leiden. See LEYDEN.
Leidy, JOSEPH (1823-91), American naturalist, born at Philadelphia. He became professor of anatomy in the university of Pennsylvania (1853), and professor of biology there (1882). He contributed numerous papers to scientific journals, and his books include *Cretaceous Reptiles of the United States* (1865), *Treatise on Human Anatomy* (1860), and *Fresh Water Rhizopods of N. America* (1879).

Leigh, munic. bor., Lancashire, England, 7 m. S.E. of Wigan. Industries: coal-mining, cotton

From that year until his election to the presidency of the Royal Academy in 1878, and through his long tenure of that office, his success was unbroken. He was raised to the peerage (1876), and received many other honours. Throughout his art life there was a steadily growing love of classic subjects—i.e. for those subjects which lent themselves to undramatic and decorative treatment, such as his *Daphnephoria*, *Phryne*, and *The Garden of the Hesperides*. No contemporary draughtsman has excelled him in the drawing and painting of complicated drapery, and in all his work there is to be discerned an absorbing love of beauty. The dignified head of a school, his influence on English art is marked. He died in London, and was buried in St. Paul's Cathedral. In addition to his oil paintings, he did fine work in sculpture and in black and white, executed the important frescoes of *The Arts of War and Peace* in the South Kensington Museum, and of *The Wise and Foolish Virgins* in St. Michael's Church, Lyndhurst. He is also well represented in the Birmingham and Tate Galleries, and at Leighton House, Kensington, now belonging to the nation. Among his representative works are *Clytemnestra*, *Helios* and *Rhodos*, *Phryne at Eleusis*, *Rizpah*, *Cymon and Iphigenia*, *The Last Watch of Hero*, and *Elijah in the Wilderness*. See Ruskin's *Academy Notes*, 1855 and 1875; Lang's 'Lord Leighton' (in *Art Annual*, 1884); Ruskin's *The Art of England* (1884); Rhys's *Sir Frederick Leighton* (1895); Bayliss's *Great Painters of the Victorian Era* (1902); Corkran's *Frederic Leighton* (1904); and an excellent article in Bryan's *Dict. of Painters* (vol. iii, 1904).

Leighton, JOHN (1822), English artist, born and studied in London, and in outline work and design has shown considerable originality, having interested himself for many years in the technical phases of art and craftsmanship. He is the author, as 'Luke Limmer', of *Suggestions in Design* (1853) and *Paris under the Commune* (1871), and was an original proprietor of the *Graphic*, and one of the founders of the Ex-Libris Society.

Leighton, ROBERT (1611-84), Scottish prelate, born, it is supposed, in London; was educated at Edinburgh and at Douay in France. Returning to Scotland, he was licensed to preach, and ordained to Newbattle (1641), being then an enthusiastic Presbyterian. From Newbattle he was translated to Edinburgh as principal of the university (1652). On the establishment of Episcopacy in Scotland he was offered and



Leicestershire was the scene of many conflicts. Area, 823 sq. m.; pop. (1901) 433,994.

Leichardt, suburb, 3 m. N. of Sydney, N.S.W. Pop. 17,484.

Leichhardt, FRIEDRICH WILHELM LUDWIG (1813-74), Australian explorer, born at Trebatsch, S.E. of Berlin; went to Australia (1841), commenced inland exploration work in the unknown regions of the continent, and directed an overland route expedition from Darling Downs to Port Essington. In 1847, starting from Queensland with the intention of crossing Australia from east to west, he was never again heard of.

and silk manufactures, brewing, agricultural implements, and foundries. Pop. (1901) 40,001.

Leighton, FREDERIC, BARON LEIGHTON OF STRETTON (1830-96), English historical painter and sculptor, born in Scarborough. When fifteen he entered the Royal Academy at Berlin, thereafter proceeding to Brussels, Frankfurt, Paris, Florence, and Rome. He was twenty-five when he exhibited his first picture in the Academy (1855), *Cimabue's Madonna carried in Procession through Florence*, which created a profound sensation in the art world of London, and which was purchased by Queen Victoria.



A Picture by Sir Frederic Leighton—'Captive Andromache.'

After the fall of Troy, Andromache, wife of Hector, was carried as a captive to Greece by Neoptolemus, son of Achilles. Her story is told by Homer in the 'Iliad,' and by Euripides in 'Andromache.'

(125 years of the British Photographic Club)

accepted the see of Dunblane (1661), from which he was transferred to Glasgow as occupant of the archiepiscopal throne (1669). Anxious for rest and seclusion, however, he was permitted to resign (1674). He spent the last ten years of his life in Sussex. Leighton published nothing during his lifetime, but several volumes of sermons and lectures, as also his Commentary on St. Peter, were edited by Dr. Fall after his death. There are also later and fuller editions of his works by Doddridge (1748), Jerment (1808), Pearson (1825), Aikman (1831), and West (1869-75). See Memoir prefixed to Pearson's edition and Blair's *Selections from Leighton's Writings* (1883).

Leighton Buzzard (*Leighton Beau-desert* or *Bosard*), mkt. tn. and par. in s.w. of Bedfordshire, on the Ousel and the Grand Junction Canal, 40½ m. by L. & N.W. Ry. from London. There is an ancient cruciform church (restored 1886), a 14th-century Gothic market cross (restored 1852), and remains of a large circular intrenchment. There is some trade in timber, iron, and corn. Pop., reg. sub-dist. (1901) 12,329. See J. Stevenson's *Old Times in Leighton Buzzard* (1891).

Leiningen, a princely house of Germany, dating back to the 11th century, but after the peace of Luneville (1801) its lands became absorbed in the territories of Baden, Bavaria, and Hesse, and the independence of its princes was lost.

Leinster, E. prov. of Ireland, extending from Dundalk Bay to Waterford Harbour. Other inlets are Dublin Bay, Wexford Harbour, and Ballyteige Bay. It comprises twelve counties—Louth, Meath, Dublin, Wicklow, and Wexford, on the coast; Kilkenny, Carlow, Kildare, Queen's, King's, Westmeath, and Longford, inland. The principal mountains are the Wicklow (Lugnaquilla, 3,039 ft.) and Slieve Bloom Mts. The rivers are the Boyne, Liffey, Barrow, and Nore. There are few lakes. Its coal field is the most productive in Ireland. Area, 7,619 sq. m. Pop. (1901) 1,152,829.

Leipa. See BÖHMISCH-LEIPA.

Leipzig. (1.) Circle, kingdom of Saxony, borders N. and N.W. on the Prussian prov. of Saxony, S.W. on the duchy of Saxe-Altenburg. The country is a fertile plain, with only a few mountain ridges in the S. and the E. Agriculture and the rearing of cattle flourish; there are also coal mines and granite and porphyry quarries. Area, 1,393 sq. m.; pop. (1900) 1,060,632. (2.) Town, cap. of the above, 101 m. S.S.W. of Berlin, is the seat of the Reichsgericht, the highest

court of justice within the German empire. Auerbach's Keller (cellar), immortalized in Goethe's *Faust*, consisting of wine vaults dating from 1530, still serves as a restaurant. The churches of St. Nicolas (1017) and St. Thomas (1222) are the oldest. The famous university, founded in 1409, has (1902) 225 lecturers, and is attended by over 3,600 students. Papermaking, printing, and book-binding are among the industries. Leipzig is also an important manufacturing, commercial, and banking centre. The first mention of the town, which is of Wendish origin, occurs in 1015 as Lipzi. It made rapid progress in the following centuries, but suffered severely during the Thirty Years', Seven Years', and Napoleonic wars. The most celebrated of the battles of Leipzig was that between the French, under Napoleon, and the allied armies of Austrians, Russians, Prussians, and Swedes (Oct. 16-19, 1813), the result of which effectively shattered Napoleon's power. (See also BREITENFELD.) Pop. (1900) 456,124. See Hasse's *Die Stadt Leipzig* (1878), Grosse's *Geschichte der Stadt Leipzig* (1837-42), and Wuttke's *Die Völkerschlacht bei Leipzig* (1872).

Leith, important seaport, munic., and parl. bur., 2 m. N. of Edinburgh, on the southern shore of the Firth of Forth. It is joined to Edinburgh by a long street named Leith Walk. Its history is varied: it was twice seized and burned by the Earl of Hertford (1544 and 1547); besieged by the Protestants (1559-60); one of Cromwell's generals held the town in 1650; and the Jacobites seized Leith Fort, and burned the Custom House (1715). The harbour works are extensive, with a quayside of over four miles. Industries: shipbuilding, flour mills, sugar refineries, roperies, chemical works, and sawmills. The principal imports are grain, flour, sugar, chemicals, esparto, and timber. The exports include coal, iron, petroleum, whisky, and paper. There is regular steamboat communication with London, Aberdeen, Hamburg, Antwerp, and New York. With Portobello and Musselburgh, Leith returns one member to Parliament. Pop. (1901) 76,667. See Campbell Irons's *Leith and its Antiquities* (1897).

Leitha, riv. Austria-Hungary, formed by the union of the Schwarza and Pittenau. It flows N.E. for 110 m. to join the Danube at Ungarisch-Altenburg.

Leitmeritz, tn. and episc. see of Bohemia, Austria, 36 m. N.N.W. of Prague, on the r. bk. of the Elbe. Industries: brewing, malting, brick-making, iron-founding, and printing. Pop. (1900) 13,075.

Leit-motif ('guiding theme'), in music, the term applied in some forms of composition to distinctive passages or phrases associated with certain prominent ideas, situations, or characters in the work. Wagner in his musical dramas has carried the idea of the *motif* to its highest development.

Leitomischl, tn., Bohemia, Austria, 55 m. S.E. of Kolín; has a Piarist college and a castle. Pop. (1900) 8,075.

Leitrim, maritime co., prov. Connaught, Ireland, opening on Donegal Bay, and almost cut in two by Lough Allen. The N. part is generally mountainous, with fertile valleys. East of Lough Allen is another mountainous tract, with Slieve Anierin (1,922 ft.), the highest point in the county. The S. part is more open and well suited for cultivation. The Shannon enters the county N. of Lough Allen, and partly forms the S.W. boundary. Lakes are numerous. Agriculture is the chief industry; fodder crops, oats, and potatoes are cultivated. Coal is worked, and iron and lead occur. The county returns two members to Parliament. The Longford and Sligo Ry. and its branch serve the county town, Carrick-on-Shannon. Area, 580 sq. m. Pop. (1901) 69,343.

Leiva, tn., Boyaca, Colombia, S. America, about 14 m. N.W. of Tunja, with copper, silver, and sulphur mines. Centre for cultivation of vines and olives. Alt. 6,500 ft. Pop. about 4,500.

Leixões, seaport, the lower port of Oporto, Portugal, 3 m. N. of mouth of river Douro. Its harbour has an area of 220 acres, with a depth of 50 ft., and admits vessels of over 5,000 tons.

Lei-yang, tn. in S. Hu-nan, China, on the Lei, the centre of a coal district, 26° 26' N. and 112° 50' E.

Lek, deltaic arm of the Rhine in the Netherlands, linking the Neder (Lower) Rhine with the Nieuwe (New) Maas. See RHINE.

Leland, CHARLES GODFREY (1824-1903), American author, born at Philadelphia; edited the *Continental Magazine* during the civil war, but from 1869 lived mostly in England. He published two important books on the English Gypsies (1875, 1882), but is best known as the author of the diverting *Hans Breitmann's Ballads* (last ed. 1884), dialect poems in Pennsylvania Dutch-English. See his autobiographical *Memoirs* (1893), Pennell's *Life* (1905), and the *Atlantic Monthly* (1905).

Leland, JOHN (?1506-52), English antiquary, born in London; was appointed chaplain and 'king's antiquary' by Henry VIII. (1533), with power to search all

cathedrals, abbeys, and colleges for records. He devoted six years to the task, arranging a wonderful collection, of priceless value to antiquarians. He was made canon of King's College and prebend of Salisbury. His papers are in the Bodleian and British Museums. Leland's *Itinerary* was first published at Oxford in 9 vols. (1710), and his *Collectanea* in 6 vols.

Sea and the seaboard of Asia Minor from the river Mæander to the borders of Lycia.

Lelewel, JOACHIM (1786-1861), Polish historian, of German descent, born and educated at Warsaw; was professor of history at Vilna from 1814 to 1824, when he was dismissed for taking part in secret insurrectionary movements. A prominent leader in

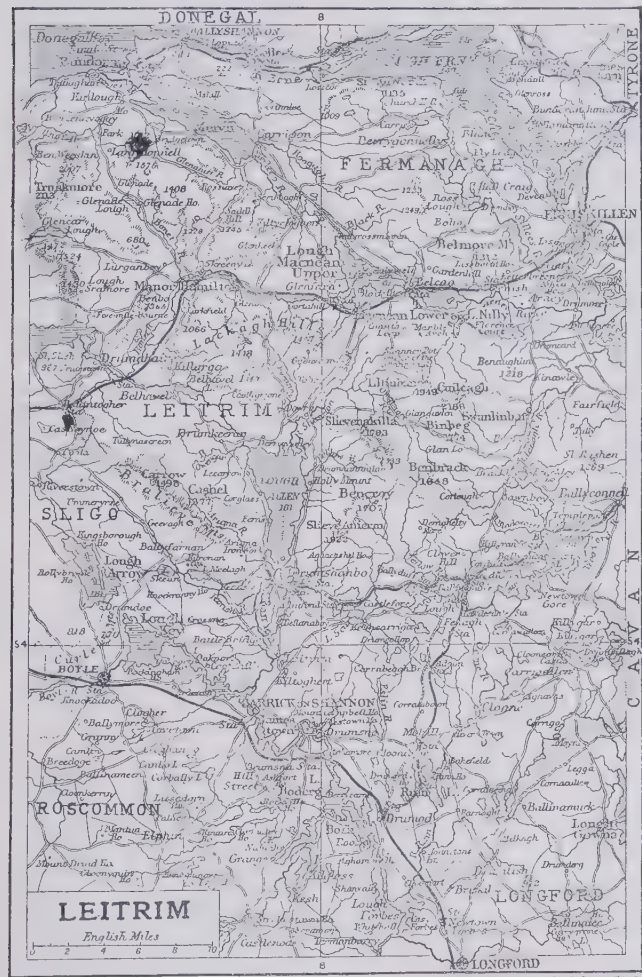
He painted portraits of Charles I., with the Prince of Orange and the Princess Mary, and of Cromwell. After the restoration he was appointed painter to Charles II., who knighted him. His work reflects the voluptuous temper of the times, and his portraits are painted with a freedom of sentiment and disregard of likeness which make them peculiarly characteristic of the period. They manifest, however, a brilliancy and grace of handling which sometimes recall Van Dyck. Many of his works are at Hampton Court and in the National Portrait Gallery. See Walpole's *Anecdotes of Painting in England*, edited by Wornum (1849), and Cunningham's *Lives of the Most Eminent British Painters* (1829-33).

Le Maire Strait. See STATEN ISLAND.

Lemaître, ANTOINE LOUIS PROSPER, known as **FREDÉRIC** (1800-76), French actor, born at Havre; became famous when he created Robert Macaire in the melodrama *L'Auberge des Adrets* at the Ambigu, Paris (1823). From this date his career was an unbroken success. Among the plays which he marked with his original and powerful impress were *Trente Ans*, ou *la Vie d'un Joueur*, *Dumas' Kean*, ou *Désordre et Génie*, and Hugo's *Ruy Blas*.

Lemaître, FRANÇOIS ELIE JULES (1853), French poet, critic, and dramatist, came first before the public with two small volumes of verse, *Les Médailles* (1880) and *Petites Orientales* (1883), and a work entitled *La Comédie après Molière* (1882). At this time he held a professorship at Grenoble, but resigned in 1884 to devote himself almost entirely to literary and dramatic criticism. His literary essays have been reprinted from the *Revue Bleue* and other journals in a series of volumes as *Les Contemporains* (1885-95); and similarly his dramatic criticisms, which have for the most part appeared in the *Journal des Débats* as 'Impressions du Théâtre' (1888-95). Of late years he has several times attempted drama, with varying success. His plays are *La Révolte* (1889), *Le Député Leveau* (1890), *Mariage Blanc* (1891), *Flupote* (1893), *Les Rois* (founded on his novel of the same name, 1895), *Le Pardon* (1895), *L'Age Difficile* (1893), *La Bonne Hélène* (1896), and *L'Ainée* (1898). In fiction he is responsible for *Sérénus* (1886), *Dix Contes* (1890), *Les Rois* (1893), and *Myrrha* (1894).

Lemberg (Polish, *Lwów*), cap. of Austrian Galicia, and archiepiscopal see (Roman Catholic, Greek Catholic, and Armenian Churches), 185 m. E. of Cracow.



(1715). See Huddesford's *Lives of Leland, Hearn, and Wood* (1772).

Leland, JOHN (1691-1766), English theologian, born at Wigan; was pastor of a Presbyterian congregation in Dublin from 1716 till his death. He wrote several works, all of them polemical.

Leland Stanford University. See PALO ALTO.

Leleges, ancient people who inhabited the isles of the Aegean

the Polish revolution (1829), he was banished. Lelewel died in Paris. His monumental works on Polish history have been collected and published (1853-76).

Lely, SIR PETER (1618-80), properly Pieter van der Fars, Dutch-English portrait painter, born at Soest, in Westphalia, became pupil of De Grebber at Haarlem, and after the death of Van Dyck came to England (1641).

The chief features of interest are the cathedrals, provincial house of assembly, university (founded in 1784; over 2,050 students), Ossolinski National Institute, polytechnic (1873-7). Machinery, beer, leather, matches, and candles are manufactured. Pop. (1900) 59,618.

Lemercier, JACQUES (?1585-1630), French architect, sculptor, and engraver, born at Pontoise; patronized by Cardinal Richelieu, and made architect to Louis XIII. (1618), in charge of the Louvre and the Tuileries. His buildings are in a modified Italian Renaissance style, the chief ones being the Sorbonne (1629), the Pavillon de l'Horloge, and various churches, amongst them St. Roche (1653), Reuil, and Bagnot. One of his greatest works in sculpture is his statuette of Henri IV. at St. Jean de Latran.

Lemgo, tn. Lippe, Germany, 58 m. s.w. of Hanover; manufactures leather, cigars, woollen goods, and meerscham pipes. It was one of the towns of the Hanseatic League. Pop. (1900) 8,840.



Lemming.

Lemming, a small rodent closely related to the vole, and belonging to the genus *Myodes*. In the Norwegian lemming (*M. lemmus*), an animal formerly distributed throughout much of Europe, the body reaches a length of about five inches. The fur is yellowish-brown, marked with spots of dark brown and black; the animal is clumsily built, with short, rounded head, blunt muzzle, beady eyes, short tail and ears. Each foot is furnished with five claws, and by means of those on the fore feet the animal excavates the shallow burrows in which it lives, and tunnels beneath the snow for its food. This food is wholly vegetable, consisting of roots, shoots, catkins, moss, and lichens. The animals usually occur either in latitudes too high for conifers, or on the slopes of mountains beyond the pine-belt. But at very uncertain intervals the lemmings greatly increase in numbers, and in search of food a great body begins to migrate towards more fertile grounds. These armies of migrating lemmings are said to number millions of individuals, and the animals show a wonderful constancy both in the act of migration and in the general direction of the movement. They cross without hesitation any bodies of water

which may block their path, and from the construction of the Scandinavian peninsula inevitably come in the long run to the sea, and the majority of those which have not perished from overcrowding, from disease, or from the attacks of their enemies, die beneath its waves. The lemming of N. Europe is replaced in N. America by the allied *M. obensis*; while the banded lemming (*Cuniculus torquatus*), which has no external ears and a rudimentary great toe, is circumpolar.

Lemnos, or LIMNOS, one of the largest islands in the Aegean Sea, about midway between Mount Athos and the Hellespont. It is in the vilayet of Jezairi-Bahri-Sefid, European Turkey, and lies some 40 m. w. of the entrance to the Dardanelles. Area, 180 sq. m. Produces grain, tobacco, and fruits. Chief port, Kastro or Lemnos, on the w. coast. Pop. 27,079 (mostly Greeks). In 1657 it passed into the hands of Turkey.

Le Moine, SIR JAMES MACPHERSON (1825), Canadian author, was born at Quebec. Writing with equal facility in French and English, he has produced numerous works on ornithology, archæology, and Canadian history, including *L'Ornithologie du Canada* (1860); *Legendary Lore of the Lower St. Lawrence* (1862); *Quebec, Past and Present* (1876); *Birds of Quebec* (1891); *Histoire, Archéologie* (1882-90).

Lemoine, JOHN EMILE (1815-92), French journalist, born in London. He became English correspondent for the *Journal des Débats*, and from 1840 till his death was editor of that paper. He was a supporter of Thiers after 1871. His publications, purely of contemporary merit, include *Etudes Critiques et Biographiques* (1852), and *Nouvelles Etudes* (1862).

Lemon, the fruit of *Citrus Limonum*, a tree or shrub belonging to the orange group. It is a native of India, but has been naturalized and is cultivated in many sub-tropical parts of the world. It is a much-branched, thorny bush, about twelve feet in height, bearing oval leaves and five-petalled flowers, followed by the well-known light yellow ovoid fruits. There are many varieties, among them the *C. javanica*, the *C. medica* (or Median lemon), the *C. margarita* (the pearl lemon), the *C. lumia* (the sweet lemon). The name is also given to the fruit of *Pasiflora maliformis* (the water lemon), and *Podophyllum peltatum* (the wild lemon). The lemon is much used both dietetically and in medicine. The oil, or so-called essence, of lemon is obtained by expression or distillation from fresh lemon peel.

Lemon, MARK (1809-70), English journalist, was born in London. He contributed to numerous journals, and was the author of several plays and novels, but is best known as one of the founders and first editor of *Punch*. From 1841 till his death his history is the history of *Punch*. See Hutton's *With a Show in the North* (1871).

Lemonade is properly a beverage prepared by extracting the juice of fresh-sliced lemons by means of hot water, and sweetening to taste; but it is more often a sweetened effervescing liquid flavoured with lime juice, citric or tartaric acid, or other substances.



Lemon Tree-twig, with Leaves and Flowers.

1, Pistil and part of stamens; 2, fruit.

Lemon Dab (*Pleuronectes microcephalus*), sometimes called lemon sole, belongs to the family of flat fishes. It is distinguished by having the eyes on the right side, the skin very smooth and slimy, and the upper surface of a rich brownish-yellow, mottled with darker and lighter spots. It is found from the Bay of Biscay to Iceland and the northern coasts of Europe, in moderately deep water, and lives mostly on sea-worms and small crustaceans. It spawns from April to the beginning of September, but chiefly in June, the female producing several hundred thousand pelagic (floating) eggs. It is caught almost entirely by trawlers. The value of the lemon dab annually landed on the British coasts is about £140,000.

Lemon Grass, a name given, from their agreeable smell, to several species of *Andropogon*, especially to *A. nardus* and *A. ciliatum*.

Le Moyné, CHARLES, SIEUR DE LONGUEUIL (1626-83), French pioneer in Canada, was a native of Normandy. He emigrated to Canada in 1641, lived for a time among the Huron Indians, and distinguished himself in the border warfare against the Iroquois and the English. He was ennobled by Louis XIV. (1668), and made captain of Montreal.

Lempa, riv., Salvador, Central America, rises in Lake Guija, Guatemala, flows E., then S., and empties into the Pacific. Length, 200 m.; navigable for small steamers for 100 m.

L'Empereur, a Canadian champagne wine which contains about 14 per cent. of alcohol. It is dry and sparkling, but cannot be compared with French wines of a similar class.

Lemprière, JOHN (c. 1765-1824), English classical scholar, born in Jersey; was headmaster of the grammar schools at Abingdon and Exeter, and subsequently held two Devonshire livings till his death. His *Classical Dictionary*, which has been many times reprinted, was founded upon Sabatier's *Dictionnaire des Auteurs classiques*.



Ring-tailed Lemur (*L. catta*).

Lemur, or GHOST, a term first applied by Linnæus to certain members of the mammalian order Primates, because of their nocturnal habits and spectral appearance. The lemurs differ in many respects from the monkeys and apes, and constitute the sub-order Lemuroidea. They all inhabit trees, and have a very varied diet, including fruit, leaves, birds' eggs, small reptiles and birds, and insects.

The distribution of the lemurs is interesting. They are specially numerous in the island of Madagascar, and elsewhere occur only on the continent of Africa, and in India and parts of the Malay Archipelago. It was at one time the custom to explain this anomalous distribution by the hypothesis of a former continent (named Lemuria by W. L. Slater) stretching across the Indian Ocean from India to

Africa *viâ* Madagascar. Such a hypothesis has been rendered unnecessary by the discovery of extinct lemuroids both in Europe and America, showing that the animals were once widely distributed. Their abundance in Madagascar is explained by the fact that in that great island the large carnivores and the higher primates are alike absent.

As an example of a lemur, mention may be made of the ring-tailed lemur (*Lemur catta*), frequently seen in this country in confinement, a furry animal with a foxy face, and a long bushy tail banded with black and white. In its native habitat it is a gregarious animal, the members of the troop being at rest during the heat of the day, but becoming noisy and active at dusk. In *Lemur catta*, as in other forms, the thumb and great toe are in each case opposable to the other digits, thus forming very efficient instruments in climbing. For other lemurs, see articles LORIS, AYE-AYE, and GALAGO.

Lemures, the name given by the Romans to the spirits of the dead; according to some authorities, it was the general name, the term *larvæ* being applied to the bad, and *manes* or *lares* to the good spirits. They were feared on account of their nocturnal wanderings, and to propitiate them a festival called Lemuralia or Lemuria was celebrated on May 9, 11, and 13. At midnight of each day the father of the family, with special ceremonies, nine times threw black beans over his head, thus banning the ghosts from the house for another year.

Lena, great river of Siberia, with a drainage area of about 900,200 sq. m. With its farthest sources in the Onot range, E. of Lake Baikal, it reaches the sea, after a course of nearly 2,900 m., through a large delta, and pours 350,000 cub. ft. of water into the ocean every second. Flowing in its upper course between Lake Baikal and the Angara, it approaches very close to the basin of the Yenisei. Its most important tributaries are the Vitim (1,300 m. long), the Olekma (1,100 m.), and the Aldan (1,300 m.), on the r. bk., and the Vilyu (2,000 m.), on the l. bk. At Kachugskoye, 30 m. above Verkholsk, the river is already 70 yds. broad; and from thence to the sea, fully 2,700 m., there is no serious obstacle to navigation. For sea traffic the Lena is less favourably situated than the Ob and Yenisei, being on the E. side of the Taimir Peninsula, and frequently choked up by polar ice. The total length of navigable waterways is 7,110 m., of which 4,835 are utilized by steamers.

Lenau, NIKOLAUS (1802-50), pseudonym of Nikolaus Niemsch von Strehlenau, Hungarian poet, born at Czatad. Of a deeply melancholic nature, Lenau visited America, and travelled in the Far West, searching there for a peace he could not find in Europe. In 1833 he returned disappointed, settled at Vienna, and subsequently at Stuttgart, where he associated with the leading poets of the Swabian school. His poems give utterance to his melancholy, and are full of sentiment, of mysterious reverie, and of vague aspirations. They include his charming lyrics *Schwieblieder*, and his epics *Faust* (1836), *Savonarola* (1837), and *Die Abtissener* (1842).

Lenbach, FRANZ (1836-1904), German portrait painter, studied at Munich under Piloty; paved the way in Germany for the realistic movement with his *Shepherd Boy* (1856), and his *Peasants taking Refuge from the Weather* (1858). He painted portraits of eminent European personalities, including Bismarck, Gladstone, Wagner, and Heyse. His emphasis of the dominant traits of character and manner revealed so strikingly the personality of his sitter that he was called the *evocatuer d'âmes*. See Pecht's 'Franz Lenbach,' in *Nord und Süd* (1877).

Lenclos. See CHONTALS.

Lenclos, ANNE or NINON DE (1616-1706), Parisian courtesan, celebrated for beauty, grace, and wit, as well as for intellectual culture, was born in Paris. Notwithstanding her numerous *liaisons*, she was admired and consulted about their works by Molière, Fontenelle, Rochefoucauld, and Voltaire, and was intimate with Madame de Maintenon and Queen Christina of Sweden. See Capefigue's *Ninon de Lenclos* (1864), and *Ninon de Lenclos* (1904).

Lenczyca (Lenchitsa), tn., Kalisz gov., Poland, W. Russia, 50 m. E.N.E. of Kalisz city, cap. of dist., on the Ner (Oder basin). Pop. (1897) 8,863.

Leng, SIR JOHN (1828), Scottish journalist and politician, was born and educated at Hull. In 1847 he became sub-editor of the *Hull Advertiser*, and in 1851 editor and proprietor of the *Dundee Advertiser*. He is also the proprietor of the *People's Journal* (1858) and the *People's Friend* (1869). He founded (1877) the *Evening Telegraph* (Dundee), a halfpenny daily, amalgamated with the *Evening Post* as the *Dundee Telegraph and Post* (1905). Sir John Leng has been one of the members of Parliament for Dundee since 1889, and is the author of *America* (1876), *Scottish Banking Reform* (1881), *American Competition with British Agriculture* (1881), *Home Rule All Round* (1890), and other works.

Lenkoran, or **LENCORAN**, tn. in Transcaucasia, Baku gov., Russia, chief tn. of Lenkoran dep., on the Caspian Sea, at the mouth of the Lenkorani, 140 m. from Baku. The trade of the town is of some importance now that a road has been made into Persia. Pop. 8,768.

Lennep, tn., Rhenish Prussia, on the river Lennep, 8 m. s.e. of Elberfeld. Manufactures: machinery, woollens, cotton, and silk. Pop. 6,500.

Lennepe, JACOB VAN (1802-68), Dutch poet and novelist, born at Amsterdam; studied law at Leyden, and while practising his profession at his native town published many poems and patriotic novels, *Nederlandsche Legendes* and *De Pleegzoon* (1833), which won him the title of 'the Walter Scott of Holland.' In addition to these he wrote several dramatic pieces, and translated from many English poets. Collected editions of his poetical works appeared (1859-72); dramatic works (1852-4); novels (1855-72). See *Lives* by Beeloo and Jan ten Brink.

Lennox. The old district of Lennox was coextensive with the ancient sheriffdom of Dumbarton, Scotland, which included, in addition to the present shire, portions of Perth, Renfrew, and Stirling. The earldom of Lennox was bestowed by David I. on a Celt named Alwyn before 1193, and passed in 1473 to his descendant, Sir John Stewart, Lord Darnley (d. 1494). Matthew, fourth earl of the Stewart line (d. 1571), in his earlier years served with distinction in France. On behalf of Henry VIII. he made various abortive descents on the west of Scotland, and on this account was, by a parliament held at Stirling (October 1545), declared guilty of treason, and his estates forfeited. Recalled by Queen Mary to Scotland (1564), the forfeiture was rescinded; and Mary married his son, Lord Darnley. After the murder of Darnley he took a prominent part against the queen. On his death (1571) the title devolved on James VI., who granted it to Charles, younger brother of Lord Darnley (April 10, 1572). He died without male issue in 1576, when the earldom again devolved on James VI., who in 1579 bestowed it on Esmé, son of John Stuart, Lord of Aubigny in France, third son of the third earl. An emissary of Mary's Roman Catholic friends, Stuart speedily won the favour of the young king, who created him Duke of Lennox (1581); but after the Raid of Ruthven he was compelled to leave the country, and he died at Paris (1583). His son, Ludovic, second duke (d. 1624), who married a daughter

of the Earl of Gowrie, was present at the Gowrie tragedy (1600), and was one of the main witnesses. After the accession of James to the English throne, he was (1613) created Earl of Richmond, and (1623) Earl of New-castle and Duke of Richmond in the English peerage. His line became extinct on the death of Charles, sixth Duke of Lennox and fourth of Richmond (1672)—the dukedom of Lennox, with all its possessions, devolving on Charles II., who in 1675 revived the title in the person of his illegitimate son, Charles Lennox (1672-1723), by Louise de Keroualle, Duchess of Portsmouth. See Fraser's *The Lennox* (1874).

Lennox, CHARLOTTE, *née* RAMSAY (1720-1804), Anglo-American poet, critic, and writer, was born in New York, and came to England when fifteen. She published poems, novels, and plays, her best-remembered work being a novel entitled *The Female Quixote* (1752), of which Fielding entertained a high opinion.

Lennox, SIR WILBRAHAM OATES (1830-97), English soldier, served through the Crimean war, and in India during the mutiny. He organized the transport in the Nile campaign (1884), and was subsequently director-general of military education, on which subject he wrote numerous papers.

Lennoxtown, tn., Stirlingshire, Scotland, 11 m. N.E. of Glasgow; has bleachfields, calico-printing, and alum works, also coal mines. Pop. (1901) 2,651.

Leno, DAN (1861-1904), comedian, whose real name was George Galvin, the son of travelling 'entertainers,' made his first appearance on the stage at the age of three, his forte being posturing, singing, and dancing. He went to London as 'champion clog dancer of the world.' After appearing in pantomime at the Surrey Theatre, in 1889 he was engaged by Sir Augustus Harris for Drury Lane, where, till 1904, he was the mainstay of every pantomime. Leno possessed not only a rich fund of comedy in his own quaint face and person, but he had that far rarer gift, the intelligence to make use of it. See Wood's *Dan Leno* (1905).

Lenormant, FRANÇOIS (1837-83), French archaeologist, born and educated in Paris. He became sub-librarian at the Institut (1862), professor of archaeology at the Bibliothèque Nationale (1874), and in the intervals of his work superintended excavations in Greece and in the south of Italy. He discovered the non-Semitic or Akkadian element in the cuneiform inscriptions, and contributed a brilliant defence of the historical value of the early

Scriptures in *Les Origines de l'Histoire d'après la Bible* (1880-82). He also wrote *Histoire des Peuples Orientaux et de l'Inde* (1869), and *Les Antiquités de la Troade* (1876).

Le Nôtre, ANDRÉ (1613-1700), French architect and landscape gardener. He was appointed by Louis XIV. to lay out the park of Versailles, the gardens of the Trianon, Chantilly, Fontainebleau, and St. Cloud, and the terrace at St. Germain. In Rome he laid out the gardens of the Vatican and the Quirinal, and in England St. James's and Kensington Gardens, and the park at Greenwich. See LANDSCAPE GARDENING.

Lenox, summer resort, Berkshire co., Massachusetts, U.S.A., $7\frac{1}{2}$ m. S.S.W. of Pittsfield, beautifully situated in a hilly district. Pop. (1900) 2,942.

Lens, tn., dep. Pas-de-Calais, France, on the Deule, 10 m. N.N.E. of Arras, in an important coal field. It has iron and steel works, and sugar and soap factories. Pop. (1901) 24,370.

Lenses are generally discs of glass with one or both of the faces curved, the simple magnifying glass or burning glass being perhaps the most familiar example. When such a lens is held so as to allow the sun's rays or the rays from any other sufficiently distant source of light to pass through it, the rays become concentrated on the farther side of the lens very nearly to a definite point, known as the principal focus of the lens. A lens thus capable of condensing a beam of parallel rays to a definite focus is called a condensing, converging, or convex lens. It may be a plano-convex lens, with one face plane and the other convex; or a double-convex lens, with both surfaces convex; or a concavo-convex lens, in which the convex face has the greater curvature. The other type of lens is the diverging or concave lens, with its three varieties—plano-concave, double-concave, and concavo-concave. When parallel rays are passed through it they are made to diverge. They cannot, therefore, be brought to a focus on the farther side; but they appear to come from a point on the side next to the source of light, and this point is one of the principal foci of the lens. In both kinds of lenses there are obviously two principal foci, situated at equal distances from the lens on opposite sides of it.

The main properties of lenses may be easily deduced from a few simple experiments. Take, for example, several magnifying glasses of different strengths, place each in turn in the path of a ray of sunlight, and measure

the distance from the lens of the position of the principal focus. It will be found that the stronger magnifying glass has the shortest focal length—that is to say, it produces the greatest convergence in the rays which were originally parallel. And generally if we arrange the lenses in order of their magnifying powers, beginning with the strongest, the result will be the same as if we had arranged them in the order of increasing focal lengths. The less the focal length, the greater the convergence, the more powerful the lens.

It remains to consider the formation of the image of an object in a lens. Let AB be a convex lens with its principal foci at F and F' , and let uv be a line representing the position of the object.

All rays diverging from a principal focus become parallel to the axis of the lens after they have passed through it, and all rays originally parallel to the axis pass through the focus on the other side of the lens. Applying these principles, we find that the ray UF , falling on the lens at P ,

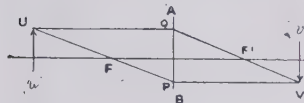


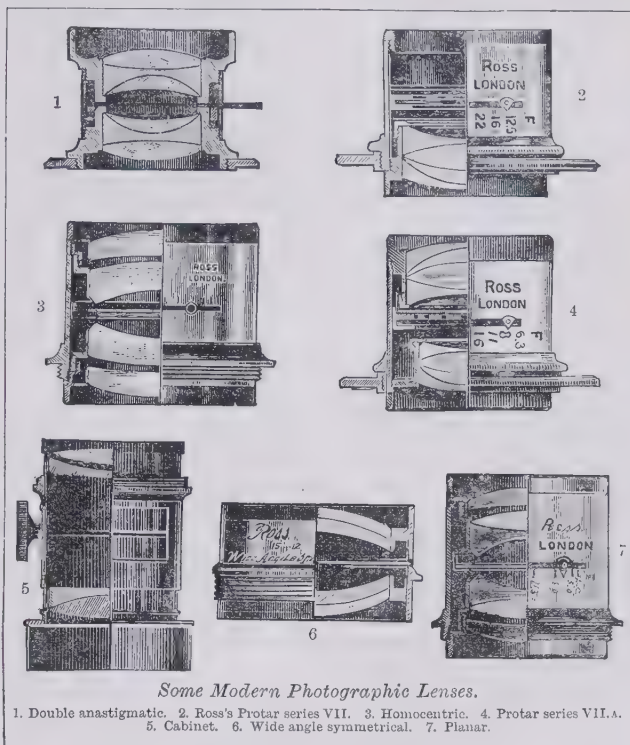
Diagram of Action of a Lens.

continues in a direction parallel to the line FF' . Also the ray UQ , drawn parallel to FF' , proceeds after refraction so as to pass through the other focus F' . Thus we have two rays from the same point U , which after refraction pursue courses meeting in the point v . This point v is therefore the image of the point U . In similar fashion we find the image v of the point u . In this case the images are formed on the other side of the lens by rays really passing through the geometrical point of intersection. The image is then a real image, and may be projected upon a screen. If the object is *within* the focal distance, the rays of light do not really meet, but they seem to come from a point on the same side of the lens as the object point. The image is formed at a farther distance from the lens than the object is, and is magnified and in the same relative position as the object. See MICROSCOPE and TELESCOPE.

Lenses are of great practical importance in correcting defective eyesight. The short-sighted eye is unable to focus clearly the rays from objects farther off than a few inches. Before clear vision is possible, the divergence of these rays must be increased. This is effected by

use of a concave lens of suitable focal length, the image of the object being formed at a distance nearer than the focus of the lens, so that divergence of the rays is increased and the image becomes clearly focussed on the retina. (See EYE.) On the other hand, in long-sightedness there is lack of power of adjustment for objects nearer than a particular distance, which may be several feet. For the clear vision of near objects it is necessary to use a convex lens which will produce a more distinct image of a near object.

bk. xxi. 1.) Unt'l the age of Gregory the Great, Lent consisted of only thirty-six days of fasting, since the Sundays were omitted, and all the Saturdays except one. It is not certain whether Gregory the Great, or Gregory II., nearly a hundred years after, added Ash Wednesday and the remainder of the week to Lent, which now, saving the Sundays, includes exactly forty days of abstinence. The last seven days are called Passion or Holy Week, commencing with Palm Sunday.



Some Modern Photographic Lenses.

1. Double anastigmatic. 2. Ross's Protar series VII. 3. Homocentric. 4. Protar series VII.a. 5. Cabinet. 6. Wide angle symmetrical. 7. Planar.

By this means the rays are rendered less divergent, and distinct vision is attained.

Special combinations of lenses are used in microscopes, telescopes, opera and field glasses, photographic cameras, and other optical instruments, the practical problem being in all such cases to get a clear-cut image free from colour fringes and not appreciably distorted. See ACHROMATIC LENS.

Lent (A.S. *Lencten*, 'spring'), the great church fast of six weeks before Easter. Originally the duration of this fast appears to have been only forty hours. (Seeingham's *Christian Antiquities*,

Maundy Thursday is kept as commemorative of the institution of the eucharist. (See also GOOD FRIDAY.) Lent cannot be strictly accounted an apostolical institution, but it is of extreme antiquity. As a preparation for Easter its reason is very evident.

Lentibulariaceæ, a natural order of dicotyledonous plants, most of which are aquatic herbs, having entire radical leaves, or multipartite floating leaves with bladders. The corolla is two-lipped, and the fruit a many-seeded capsule. *Pinguicula* (butterworts) and *Utricularia* (bladderworts) are the two British genera.

Lentils, the seeds of a small leguminous plant, *Ervum lens*,



The Lentil Plant.

of which numerous varieties are cultivated in the countries bordering the Mediterranean and elsewhere. The seeds are highly nitrogenous, and of great food value. They form the principal constituent of the well-known *Revalenta arabica* of commerce. They consist of—starch, 50 per cent.; casein, 24 per cent.; fat, 2 per cent.; and water, 14 per cent. The dark-green German lentils are much more palatable than the reddish-yellow Egyptian variety.

Lentini (anc. *Leontini*), tn., east coast of Sicily, $1\frac{1}{2}$ m. S.E. of the lake of the same name, 36 m. N.N.W. of Syracuse. It was founded by colonists from Naxos in 730 B.C. Manufactures earthenware, and is a market for wine, oil, grain, and cattle. Pop. (1901) 17,134.

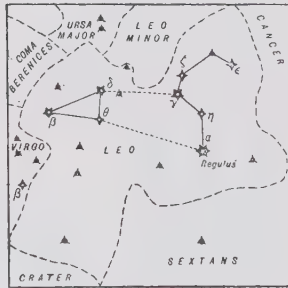
Lentulus, a patrician family of the Cornelian clan, in ancient Rome, of which the best-known member was Publius Cornelius Lentulus Sura, who was quaestor under Sulla (81 B.C.), praetor (75), and consul (71). He was ejected from the senate (70) for his disgraceful life, and joined the conspiracy of Catiline. When Catiline left Rome (63), Lentulus was head of the conspirators, but was eventually arrested and executed by Cicero.

Lenz, JAKOB MICHAEL REINHOLD (1751–92), German poet, formed for a short time one of Goethe's circle at Strassburg and

Weimar, but owing to his extremely unconventional behaviour was forced to leave Weimar, and led a wandering life until his death at Moscow. He was a typical poet of the 'storm-and-stress' period. *Die Liebe auf dem Lande*, addressed to Frederica Brion, stands high among his poems, many of which are dramatic in form. See Stöber's *Der Dichter Lenz und Friederike von Sessenheim* (1842), and Froitzheim's *Lenz und Goethe* (1891).

Lenz's Law. See ELECTRICITY, CURRENT.

Leo, an ancient constellation, and the fifth sign of the Zodiac, to which is affixed the symbol ♌. The sun enters it about July 21. The stars in the neck and mane of the 'sterism form the well-known 'sickle,' the handle being marked by Regulus. Denebola (β Leonis) is a Sirian star of 2.2 magnitude; Algieba (γ Leonis) is a slowly revolving binary, composed of 2.6 and 3.8 magnitude solar stars. R Leonis, a red star with a banded spectrum, varies from 4.6 to 10.5 magnitude in a period of 313 days.



The Constellation Leo.

Leo, the name of thirteen popes, of whom the most important call for notice. LEO I., St., surnamed the Great (440–461), born at Rome, and succeeded Sixtus III. With Leo's pontificate began the promulgation of papal letters and decrees. Leo I. merits praise for having induced Attila to spare Rome during his invasion of Italy. He also prevailed on Genseric and the Vandals to exempt the city from incendiarism, and three old basilicas from plunder. See Saint-Cheron's *Histoire du Pontificat de Saint Léon* (1846).—LEO III. (795–816) crowned Charlemagne in Rome, and in return was established as temporal sovereign over the Roman states, subject to the suzerainty of the emperor.—LEO IX. (1048–54) was a native of Alsace, of the name of Bruno, and a relative of the Emperor Conrad II.

His first Easter synod enjoined the celibacy of the clergy, and throughout his pontificate he expressed strong convictions adverse to simony and incontinence.—LEO X., Cardinal Giovanni de' Medici (1475–1521), born at Florence, the second son of Lorenzo the Magnificent, was elected Pope at thirty-six (1513). Cardinal de' Medici, before his accession to the papal chair, showed that he inherited the diplomatic skill of his father. On ascending the chair of St. Peter (1513) he showed himself, during the seven years of his occupancy, a munificent pontiff, if a vacillating and fickle politician. Leo X. made Rome the centre of the world in art and scholarship as well as in religion. See MEDICI; also Roscoe's *Life and Pontificate of Leo X.* (1806), and Audin's *Histoire de Léon X.* (1886).—LEO XIII. (1810–1903), son of Count Pecci and 258th Roman pontiff, was born at Carpineto. After taking orders, he became apostolic delegate in succession at Benevento, Perugia, and Spoleto; archbishop of Perugia (1846); cardinal (1853); Cardinal Camerlengo (1857); and finally, on the death of Pius IX. (1877), was chosen Pope (1878). He showed himself a pontiff of enlightened views, while his foreign policy was characterized by foresight and moderation. He restored the hierarchy to Scotland, settled the religious difficulty with Germany, and, though allowing great liberty of action to the Irish bishops, denounced in general terms the methods of the 'plan of campaign' in Ireland (1888). A man of wide culture, he wrote Latin verse of a high order; while in his encyclicals he strongly upheld the supreme power and influence of the papacy. See *Lives* by Bartier (1892), Norbert (1894), McCarthy (1896), and Des Houx (1900).

Leo I., FLAVIUS (400–474), Byzantine emperor, native of Thrace, was the first emperor of Constantinople crowned by a bishop. He defeated the Huns in Dacia, but while on an expedition to reconquer Africa his fleet was destroyed by the Vandals off the coast of Carthage.

Leo III. (c. 680–741), called 'the Isaurian,' emperor of Constantinople. He obtained a great victory over the Saracens, who had besieged Constantinople for two years (718–719). Leo is best remembered by his strife against the iconoclasts or image-breakers. In 734 he transferred Greece, Macedonia, and Illyria to the patriarchate of Constantinople, thus initiating the separation between the Greek and Roman churches. See Gibbon's *Decline and Fall*.

Leo, LEONARDO (c. 1694-1746), Italian composer, studied at Naples and Rome, returning in 1717 to the former city to become choirmaster and director of the musical school of San Onofrio. Among his works are the oratorios *Santa Elena* and *La Morte d'Abele*, and the operas *Sofonisbe*, *Olimpiade*, *La Clemenza di Tito*, and *Achille in Sciro*; while his sacred music includes his celebrated *Miserere*.

Leo Africanus, Berber traveller and geographer, who, towards the end of the 15th century, travelled through W. Asia and N. and Central Africa. While returning by sea from Egypt he was seized by pirates and sent to Rome, where he became a Christian. His account of his travels, written in Italian and published by Ramusio (1550), was for long the chief source of information on the Sudan.

Leoben, tn., prov. Styria, Austria, 27 m. N.N.W. of Graz, with a mining academy. There are lignite mines and iron works in the vicinity. Here were signed in 1797 the preliminaries of peace between Austria and France embodied in the treaty of Campo Formio. Pop. (1900) 10,204.

Leobschütz, tn. in Silesia, Prussia, on the Zinna, 20 m. N.N.W. of Ratibor. Manufactures woollen goods, glass, and machinery. Pop. (1900) 12,627.

Leochares (fl. 352-338 B.C.), famous Greek sculptor of the later classic school, and a contemporary of Scopas and Praxiteles. He was employed by Philip II. to execute the portrait statues of himself, Alexander, Amyntas, Olympias, and Eurydice, placed in the Philippeum at Olympia. A copy of his masterpiece, *Ganymede carried off by the Eagle of Zeus*, is in the Vatican at Rome. See Murray's *Hist. of Greek Sculpture* (1890), and Gardner's *Handbook of Greek Sculpture* (1896).

Leo Minor, a small constellation between Leo and Ursa Major, formed by Hevelius (1690). The chief star, 46 Leonis Minoris, is of the fourth magnitude and of solar type.

Leominster (anc. *Leofminstre*). (1.) Municipal bor., Herefordshire, England, 12½ m. N. of Hereford. The parish church is in part Norman, and formerly belonged to a priory. The history of the town begins in 658, when a convent was established by Mercwald, king of Mercia. Implement works, and trade in cider and hops. Pop. (1901) 5,826. See Townsend's *Leominster*. (2.) Town in Worcester co., Massachusetts, U.S.A., on the Nashua, 5 m. S.E. of Fitchburg. Manufactures paper, woollen goods, and furniture. Pop. (1900) 12,392.

Leon. (1.) Province in N.W. of Spain, intersected by the Douro and the Minho. It is mountainous in the N. and W., and covers an area of 5,936 sq. m. Agriculture is important, wheat, rye, oats, barley, and maize being largely cultivated. Cattle, mules, coal, iron, and leather are among the chief exports. Pop. (1900) 386,083. The kingdom of Leon was founded in 915, when Garcia, son of Alfonso III., became king. It suffered much from Moorish attacks and from internal feuds until the vigorous reign of Alfonso V. From 1037 to 1157 it formed part of Castile. After the latter date there was bitter strife between Leon and Castile till 1230, when Ferdinand III. permanently united his father Alfonso IX.'s kingdom of Leon with his mother Berengaria's kingdom of Castile.

(2.) Capital of above prov., 77 m. N.W. of Palencia, lies on a fertile plain between the Bernesga and the Tario; has a fine Gothic cathedral dating from the 13th century. The celebrated church of St. Isidore is of Byzantine architecture. In Roman times Leon was the country of the Seventh Legion. Parts of the Roman wall still exist. Pop. (1900) 17,022. (3.) Largest tn. of Nicaragua, Central America, and formerly cap. of the state, 35 m. N.W. of Managua; stands on a fine plain near the Pacific coast, and is surrounded by plantations. Pop. 43,000. (4.) Town, state of Guanajuato, Mexico. Copper and silver are worked in the neighbourhood, and leather is manufactured. Alt. 5,865 ft. Pop. 63,263. (5.) Town in Iloilo prov., Panay, Philippines, 15 m. N.W. of Iloilo. Pop. 13,950. (6.) ISLA DE, flat, sandy, and marshy isl. (10 m. by 2 m.), on the S.W. coast of Spain, between the Bay of Cadiz and the Atlantic.

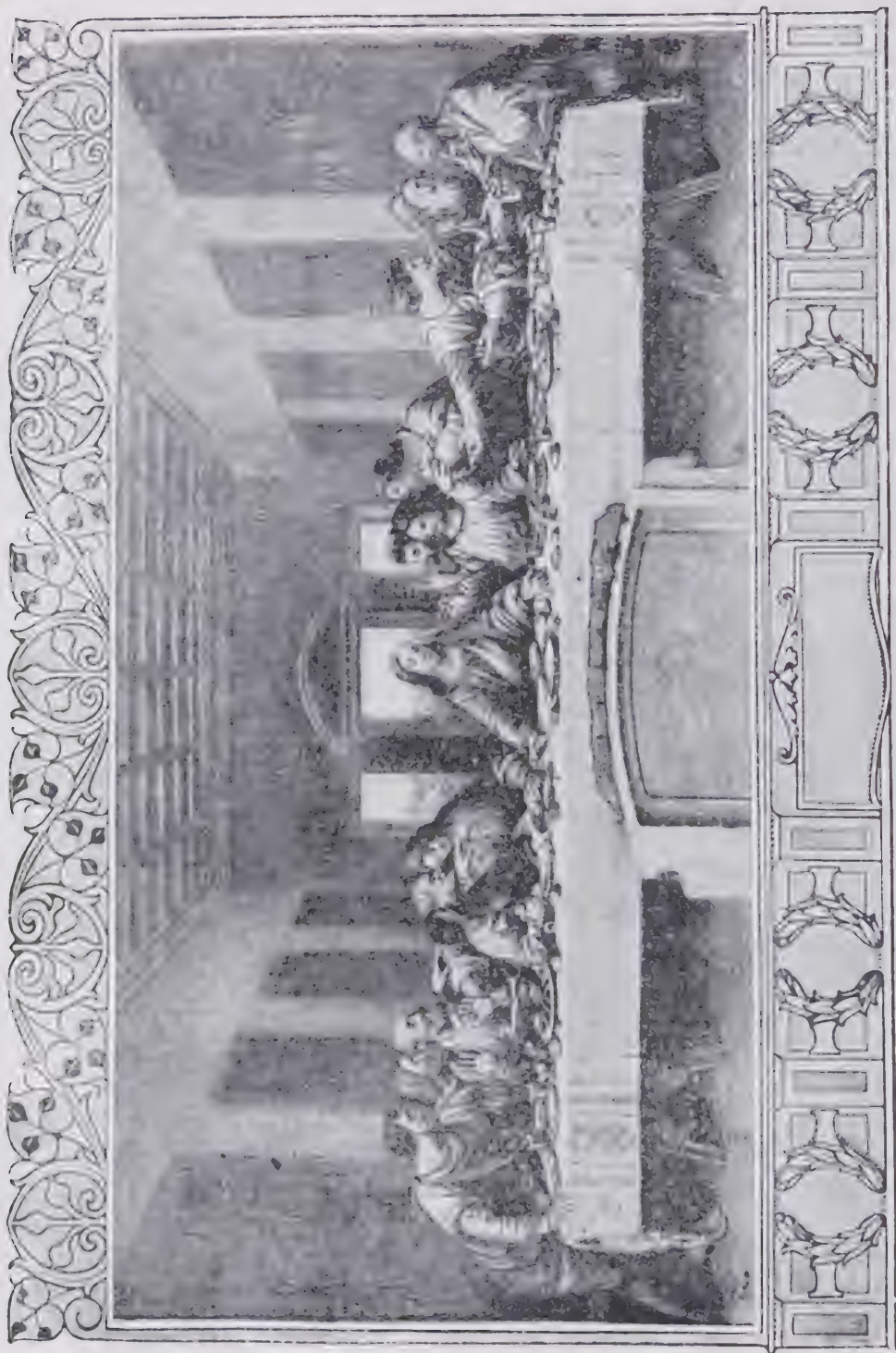
Leon, FRAY LUIS DE. See PONCE DE LEON.

Leonardo da Vinci (1452-1519), Italian painter, head of the Umbrian Lombard School, one of the most remarkable and many-sided intellects of the middle ages, appropriately named 'the Faust of the renaissance.' He was painter, sculptor, architect, musician, poet, engineer, mathematician, and philosopher, as also the great rival of Michael Angelo. Records of his early life are scanty. The illegitimate son of a peasant woman and a Florentine notary, he was educated in Florence, where he studied painting under Verrocchio. His unfinished *Adoration of the Kings* and his *Medusa's Head* belong to his Florentine period; and to his Milanese period are ascribed his most celebrated productions, the two versions of *Our Lady of the Rocks* (Louvre and National

Gallery), and *The Last Supper* (Milan). He also founded an academy of arts, for which he wrote *Notes for a Treatise on Painting*. Owing to the French occupation of Milan (1499) Leonardo returned to Florence, and was commissioned, with Michael Angelo, to decorate the council hall of the Signoria—paintings subsequently destroyed. The famous *Mona Lisa*, in the Louvre, was painted in 1504. For ten years (1506-16) he spent his time between Florence, Rome, and Milan; also painted his *St. Anne* and *St. John the Baptist*, now in the Louvre. Thereafter he accompanied Francis I. to France, and died three years later in the Château de Cloux, Amboise. A man of extraordinary physical beauty and of physical strength, his endless invention, his curiosity in science, and his ceaseless quest after the ideal and the marvellous, are reasons for the small number of pictures finished by him. Of these, the *Last Supper* is practically destroyed through his experimentation with oil methods. But he created a symbolical type of ideal female beauty, subtle, enigmatic, with the mysterious smile that has haunted and perplexed his students of succeeding generations. Da Vinci's influence through his numerous important pupils has been potent; and many of his great works can be studied in the Uffizi, in Turin, in the Ambrosiana at Milan, in the Louvre, in S. Kensington Museum, and in the royal collection at Windsor. See Brown's *The Life of Leonardo da Vinci* (1828), Rio's *Leonard de Vinci et son Ecole* (1855), Heaton and Black's *Leonardo da Vinci and his Works* (1873), Houssaye's *Histoire de Léonard de Vinci* (1876), Richter's *Literary Works of Leonardo da Vinci* (1883), and Seailles's *Léonard de Vinci, l'Artiste et le Savant* (1892).

Leonforte, walled tn. in Catania prov., Sicily, Italy, 49 m. W. of Catania; trades in sulphur, cattle, wine, and oil. From the town N.W. through the mountains to Termini Imerese is a highway, 63 m. long, the mediæval route of raiding Arabs from Palermo into the interior. Pop. 19,751.

Leoni, LEONE (1509-90), Italian sculptor, goldsmith, and medalist, was born at Arezzo. Through the influence of Ferrante Gonzaga he entered the service of the Emperor Charles V., and remained attached to the imperial household during the remainder of his life. Statues of Charles V. and the queen of Hungary are at Madrid, and other examples of his work are in the Museo del Prado, Madrid, in the Louvre, and at Vienna.



A famous painting by Leonardo da Vinci.—'The Last Supper.' From the original painting.

Leonidas, in ancient Greek history, the famous Spartan who commanded and died at Thermopylae. He was king at Sparta (491-480 B.C.), in which latter year he went to hold the pass of Thermopylae against the forces of Xerxes, with only 300 Spartans and 5,000 allies. For two days Leonidas and his soldiers held the pass against the flower of the Persian army; but the next night a traitor showed the Persians a path over the mountains, which enabled them to take the Greeks in the rear. They fell to a man.

Leonid Meteors, a swarm of minute bodies revolving round the sun in 334 years, and crossing the earth's orbit at the point traversed by it about November 15. Hence arises a periodical shower of falling stars, called Leonids, because they appear to diverge from a small sky area near Leonis. The position of the 'radiant' indicates the trend of their parallel tracks, and is merely their perspective vanishing point. The Leonids are characterized by their swiftness, their greenish tint, and their persistent trains. Being retrograde travellers, they meet us with a velocity of forty-four miles a second. The first authentic notice of a Leonid display was in 902, brilliant recurrences being observed in 1202 and 1366, in 1799 by Humboldt at Cumana, and universally on Nov. 12, 1833. The periodicity of the phenomenon was then recognized, and the prediction of its conspicuous visibility on Nov. 13, 1866, obtained full verification. Its retardation by about three days in each century depends upon the progression of the node resulting from perturbative planetary action. Planetary disturbance, too, doubtless occasioned the failure of the expected meteors on Nov. 15, 1899; for the main body of Leonids, having swerved aside, may never again encounter the earth. These meteors follow in the wake of Tempel's comet of 1866, and, according to Leverrier, were possibly introduced with it into the solar system through the influence of Uranus, 126 A.D., when comet and meteors presumably formed one compact mass. At present Leonid stragglers are dispersed round the entire orbit, and the denser portion of the swarm is distributed over a section of it measured by hundreds of millions of miles.

Leonine Verse, a popular mediæval form of Latin verse, in which the syllables immediately preceding the cæsure of a line rhyme with the final syllables—*e.g.*:

'En rex Eduardus, debacchans ut leopardus.'

Strictly speaking, only elegiac verse (alternate hexameters and pentameters), as in Bernard of Morlaix's *De Contemptu Mundi*, can be termed leonine; but the term is loosely used of all interchanging Latin verse. Single leonine verses are met with occasionally in classical Latin, even outside the works of Ovid—as:

'Vincla recusantur et sera sub nocte rudentur;'

or, in the Sapphic measure:

'Pone me pigris ubi nulla campis Arbor æstiva recreatur aura.'

The origin of the term is attributed to Leoninus, canon of St. Victor's, Paris (circa 1150), as also to Pope Leo II. For an account of rhyme in classical Latin, see Munro's *Lucretius*, preface to notes.

Leonnatus, a Macedonian of Pella, and one of the principal officers of Alexander the Great, having previously served as one of the bodyguards of Philip. In 327 he helped Peucestes to save Alexander's life in battle. For this and for other services Alexander presented him with a golden crown at Susa in 325 B.C. After Alexander's death he was made satrap of Lower Phrygia. He fell in battle while attempting the relief of Antipater, who was blockaded at Lamia in Thessaly by the revolted Greeks.

Leontotis, a genus of shrubs and herbs belonging to the order Labiate, family Ballotidæ, natives of tropical or subtropical regions. They are characterized by dentate leaves and by showy red or yellow sessile flowers. The most valuable species is *L. Leonurus*, or lion's tail, a hairy shrub from S. Africa, with whorls of long scarlet flowers in winter. Another good species is *L. nepetifolia*, which bears orange-coloured flowers in autumn. Propagation is easy by means of cuttings taken in spring.

Leon Pinelo, ANTONIO DE (c. 1590-1675), Spanish lawyer and author, born at Cordoba, Argentina. Leon Pinelo was judge of the tribunal of the Casa de Contratacion at Seville, and was appointed royal historiographer (1637). His most important works are the colonial code, *Recohilacion general de las Leyes de las Indias* (finished in 1635, made authoritative by royal command in 1680), and *Biblioteca Oriental y Occidental, náutica y geográfica* (1629), the first bibliography of the Spanish colonies.

Leontini. See LENTINI.

Leontodon, a genus of composite-flowering plants with dentately-lobed leaves, the lobes pointing backward, an involucre imbricated with scales, a flattened fruit with a long beak, and a hairy

white pappus. The flowers are all strap-shaped, and the flower-stalk is hollow and smooth, with a single flower-head on its summit. The leaves are radicle. The common dandelion, *L. taraxacum*, is a member of this genus.

Leontopodium, or LION'S FOOT, a genus of herbaceous plants belonging to the order Compositæ. They bear dense cymes of flowers at the summits of the branches, and all are hairy or woolly plants. The most interesting species is *L. alpinum*, the edelweiss, a well-known Alpine plant, frequently cultivated in gardens. It is a dwarf plant, and bears its flowers in summer.



Leopard.

Leopard (*Felis pardus*), a carnivore closely allied to the lion and the tiger, but differing in its inferior size, and in the fact that its tawny coat is covered with dark spots, formed by an incomplete ring of black enclosing a bright central patch. In addition to this brightly-coloured form, there exists also the black leopard or panther, formerly regarded as a distinct species, but now proved to be merely a variety. Leopards occur throughout India, Ceylon, and Burma, in Persia, Palestine, Syria, Arabia, and Africa; while formerly their distribution was even more extensive. They are very active animals, and differ from lions and tigers in that they habitually climb trees. The total length, including the tail, is sometimes as much as eight feet. In India the leopard preys chiefly on dogs and on various kinds of monkeys; but it is capable of killing a bullock or the sambar deer. The litters consist of from two to four cubs, which in India are born in spring. Leopards chiefly inhabit rocky hills covered with scrub.

Leopardi, COUNT GIACOMO (1798-1837), Italian writer, born at Recanati, of a noble but impoverished family; was a cripple through life. He devoted his youth to so close a study of the classics that he became one of the most brilliant scholars of the day, while all his earlier work is thoroughly imbued with a classical sense of form. Unhappy at home, he left it in 1822, and led a wretched and penurious life at Rome, Milan, Bologna, Florence, and Pisa. Later he found

a refuge in the house of Antonio Ranieri at Naples, where he died. Leopardi's pessimism is justified by his physical sufferings and by the circumstances of his life. The poems of his first period (1819-26), consisting of the *Idilli* and the first ten *canzoni*, are freer in their style, though still bound by classical form. The *canti* of the second period (1826-36) represent the struggle between the poet's pessimism and his lost ideals. In the *Paralipomeni della Batracomiomachia* he satirizes the political and other aspira-

Mestica (1890, 1899) and by Carducci (1898-1900). The best edition of the *Epistolario* is the fifth, edited by Piergili (1892). See the biographies by Montanari (1838), Giotti (1862), Bouché-Leclercq (1874), Rosa (1880), Annovi (1898), and Cesareo (1902). Leopardi's poems were translated into English by Cliffe (1893, 1903), Morrisca (1900), and Sir T. Martin (1904); his prose works by Edwards (1882), Patrick Maxwell (new ed. 1905), and by the poet James Thomson (1893; new ed. 1905).

crown of Spain for his son Charles, and thus initiated the war of the Spanish Succession, which was continued under his successors Joseph I. and Charles VI. See Baumstark's *Kaiser Leopold I.* (1873).

Leopold II. (1747-92), Holy Roman emperor, third son of Francis I. and Maria Theresa, became grand-duke of Tuscany (1765), and succeeded his brother, Joseph II., as emperor (1790). In 1792 he concluded an alliance with Prussia for the restoration of Louis XVI. of France, but died just as hostilities were about to begin.

Leopold I., GEORGE CHRISTIAN FREDERIC (1790-1865), king of the Belgians, son of Francis, Duke of Saxe-Coburg. At an early age Prince Leopold took service with Russia, and in 1813 fought against Napoleon at Lützen, Bautzen, and Leipzig, and entered Paris with the allied sovereigns. Prince Leopold visited England in 1815, and the following year married the Princess Charlotte, daughter of George IV.; was naturalized, and created Duke of Kendal and made a general in the British army. A year and a half later, in December 1817, the princess died in childbirth. Prince Leopold was offered but declined the crown of Greece in May 1830. In the same year Belgium revolted from the Netherlands, and in 1831 Prince Leopold was elected first king of the Belgians. On Aug. 9, 1832, he married Louise, eldest daughter of Louis Philippe. King Leopold received the title of 'Juge de Paix de l'Europe' by reason of his frequent good offices as umpire in international disputes.

Leopold II., LOUIS PHILIPPE MARIE VICTOR (1835), king of the Belgians, was born at Brussels, and succeeded his father, Leopold I., on December 10, 1865. King Leopold was proclaimed sovereign of the Congo Free State (1885). The Free State is the successor to the Congo International Association, which was founded in 1883 by King Leopold. King Leopold married, on Aug. 22, 1853, the Archduchess Marie Henriette Anne of Austria, and by her had four children—the Duke of Brabant (d. in 1869 at the age of ten), Princess Louise (m., 1875, to Prince Philip of Saxe-Coburg-Gotha), Princess Stephanie (m. first, 1881, to Archduke Rudolf, who died in 1889, and second, 1900, to Count Lonyay), and Princess Clementine (b. July 30, 1872). The queen of the Belgians died on Sept. 19, 1902. See MacDonnell's *King Leopold II.: his Rule in Belgium and the Congo* (1905).

Leopold, KARL GUSTAF (1756-1829), Swedish poet, born at



Leopold II., King of the Belgians.

(Photo by Numa Blanc.)

tions of contemporary Italy. His prose is no less admirable than his verse. The *Epistolario*, in which Leopardi reveals his innermost self, is a most valuable and touching human document. Ranieri collected Leopardi's works in six volumes (1845-9), and afterwards published his *Sette anni di sodalizio con G. Leopardi* (1880). The best editions of the poems are those of Chiarini (1886) and Mestica (1886); while Straccali wrote a good commentary on them (2nd ed. 1895). The prose works have been well edited by

Leopold, LAKE. See RIKWA, LAKE.

Leopold I. (1640-1705), Holy Roman emperor, son of Ferdinand III., became king of Hungary (1655), and king of Bohemia (1657). Elected emperor (1658), he made war with the Turks, whose defeat at St. Gothard (1664) led to the peace of Temeswar. His persecution of the Protestants of Hungary caused an insurrection, which he suppressed with the aid of John Sobieski, king of Poland (1683). In 1701 Leopold claimed the

Stockholm. In 1786 he was called to assist Gustavus III. with his dramatic works, and ultimately became the king's private secretary (1788) and an academician. His tragedies, *Odin* and *Virginia*, seem turgid enough now, but they were the admiration of his contemporaries. Much more pleasing are his poems, mostly didactic and moral. See his *Poetiska Skrifter* (1873).

Leopoldville, trading station (founded by Stanley in 1882) in the Congo Free State, W. Africa, on l. bk. of the Congo, at the entrance to Stanley Pool. Beyond it the river is open for navigation for 1,000 m. There is a government organized transport service of thirty steamers for the Upper Congo trade. Seaward the river's course is beset with cataracts, and a railway (250 m.) has been constructed between Matadi and Leopoldville.

Leosthenes, an Athenian who commanded the confederate Greeks in the Lamian war (322 B.C.), and fell in battle before Lamia while besieging Antipater in that town.

Leotychides, king of Sparta, reigned from 491 to 469 B.C. He commanded the Greek fleet against the Persians, and won the battle of Mycale (479).

Leovigild, LÖWENHELD (d. 586), king of the Visigoths in Spain from 569. In his reign the Vandals and Byzantines who occupied Andalusia were subdued. Arianism was maintained by Leovigild, in spite of the revolt of his son Hermenegilde and the intervention of France; but ultimately the heresy was vanquished, and Spain was reunited to the Roman Church under Gregory the Great in 590 A.D. See Bradley's *Story of the Goths* (1888).

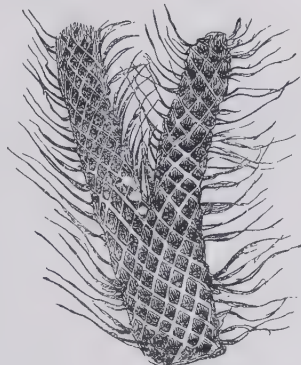
Lepage. See BASTIEN-LEPAGE.

Lepanthes, a genus of tropical epiphytal orchids, of which the W. Indian *L. sanguinea*, with red flowers, and the New Granada *L. calodictyon*, with small orange and red flowers, are the best-known species.

Lepanto (anc. *Naupactus*), seapt. of Greece, on the N. shore of the entrance to the Gulf of Lepanto, 1½ m. N.E. of Patras. The STRAIT OF LEPANTO, 1 m. wide, is the entrance to the Gulf of Corinth, and is defended by a castle on either side. Here, on Oct. 7, 1571, Don John of Austria, commanding the allied fleet of Austria, the Italian states, and Spain, encountered a powerful Turkish fleet under Ali Pasha, which he completely defeated, thereby releasing about 15,000 Christian galley slaves. It is the practice of both Spain and Italy to name ships of war in honour of the victory. The Spanish *Lepanto* is a twin-screw steel-protected cruiser

of 5,000 tons and 11,500 I.H.P., built at Cartagena in 1892. The Italian *Lepanto* is a twin-screw steel barrette battleship of 15,400 tons and 15,797 I.H.P., built at Leghorn, and radically reconstructed in 1891. For the Gulf, see CORINTH.

Lepchas, people of Tibetan stock inhabiting Sikkim, Bhutan, and part of E. Tibet, and consisting of two branches, which they designate Róng and Khamba. Their religion is Lamaism. See Von Schlagintweit's *Results of a Scientific Mission to India and High Asia* (1863); Rowney's *Wild Tribes of India* (1882); Donaldson's *In Lepcha Land* (1900).



Portion of *Lepidodendron*.

Lepidodendron is the generic name of a large and important group of plants which flourished principally in the Carboniferous period. The outer surface of the bark is marked by lozenge-shaped, scale-like markings, the leaf-cushions. These are arranged in dense spirals, which wind around the stems. Often the narrow and pointed leaves are found still adherent; they may also carry cones (*Lepidos-trobi*), which in form somewhat resemble those of the fir. The branches usually fork repeatedly, and were implanted on a massive stem which had a similar external sculpture. Some of these stems have been seen in the roofs of coal-workings with a length of a hundred feet. Their roots are generally known as stigmara. The *Lepidodendra* belonged to the Lycopodiaceæ, and have their nearest representatives in the diminutive club-mosses, which they resemble even in their superficial characters. See Solms-Laubach's *Fossil Botany* (1891).

Lepidoptera (lepis, 'scale,' pteron, 'wing'), an order of insects which includes the butterflies and moths, and is marked by the following characteristics:—There are four pairs of wings, and both they and the body are covered with scales, fre-

quently bright-coloured, which on the body may resemble hairs in appearance. The imago, or perfect insect, is devoid of biting jaws, and usually possesses a long protrusible proboscis. The metamorphosis is well marked, and the larva (caterpillar) has powerful jaws, and is almost invariably vegetarian in diet. In the pupa stage the appendages are usually cemented to the body, which is invested by a continuous horny skin, and frequently by a cocoon in addition. See BUTTERFLIES, MOTHS, CATERPILLAR, and INSECTS.

Lepidosiren, one of the three living genera of Dipnoi. See DIPNOI.

Lepidosteus. See GAR-FIKE.

Lepidus, the name of a distinguished family of the Æmilian clan in ancient Rome, of patrician rank. Its most famous members were:—(1.) MARCUS ÆMILIUS LEPIDUS, who was prætor in Sicily (81 B.C.), and consul (78 B.C.), as representing the popular faction, with Catulus as a colleague. Subsequently the senate ordered Lepidus to retire to his province of Further Gaul; but he remained in Etruria, collected an army, and marched on Rome. He was defeated in the Campus Martius by Pompey and Catulus. (2.) MARCUS ÆMILIUS LEPIDUS, one of the triumvirs with Augustus and Antony, a son of the above, was prætor (49 B.C.), and took Cæsar's side against Pompey. He was consul (46 B.C.), and was governor of Gallia Narbonensis and Hispania Citerior (44 B.C.). At the time of Cæsar's death he was near Rome, and aided Antony, afterwards becoming *pontifex maximus*. In 43 B.C., Antony, after his defeat at Mutina, took refuge with Lepidus, when they together crossed the Alps at the head of a strong army, and were joined by Octavian (Augustus), whom the senate expected to oppose them. In October of that year they formed the second triumvirate. After the battle of Philippi (42 B.C.) he received the government of Africa, and remained there until 36 B.C., when Augustus called him to Sicily to help in the war against Sextus Pompeius. Lepidus came, but tried to secure Sicily for himself. Augustus easily subdued him, and deprived him of his triumvirate, his army, and his province, but allowed him to retain the pontificate, and to live in retirement at Circii, where he died (13 B.C.).

Le Play, PIERRE GUILLAUME FRÉDÉRIC (1806-82), French economist, was born at La Rivière Saint Sauveur in the Calvados. Napoleon III. appointed him to organize the exhibition of 1855;

he was also prominently connected with the London Exhibition of 1862, and the Paris Exhibition of 1867. In 1881 he commenced the publication of *La Réforme Sociale*, a fortnightly journal. He is regarded in France as the founder of social economy; and on this subject he has published *La Réforme Sociale en France* (1864), *L'Organisation du Travail* (1870; Eng. trans. 1872), and *La Constitution Essentielle de l'Humanité* (1881).

Lepontine Alps, the name of that portion of the main chain of the Alps included between the Simplon Pass on the W. and the Splügen Pass on the E. In the E. half (Adula Alps) are included all the various sources of the Rhine; the hills round the Italian lakes

ing a susceptibility to the disease. Clinically two forms of leprosy are recognized—(1) the tubercular, and (2) the anæsthetic. In the former, the tubercles are composed of masses of cells which vary in size and are embedded in connective tissue. Around and in the cells are great numbers of the bacilli lepræ. The skin becomes covered with the outgrowths, and is subject to ulceration between them. Considerable deformity is produced by the tubercles and by the cicatrization of the ulcerated areas; while if the ulceration is deep, there may be extensive destruction of tissue and the loss of fingers or of toes. In some forms the affected area becomes perfectly white. The hair generally disappears, and sooner or later

The course of this form of the disease is very slow. No remedy is as yet known for leprosy, but general tonics and antiseptic treatment of such local manifestations as ulceration may mitigate the patient's sufferings. Isolation, cleanliness, and measures of sanitation are of use as prophylactics. The celebrated leper settlement at Molokai in the Pacific is described by R. L. Stevenson in his *Father Damien* (1890). See also Marsden's *On Sledge and Horseback to Siberian Lepers* (12th ed. 1905).

Lepsius, KARL RICHARD (1810-84), German Egyptologist and archæologist, was born at Naumburg. His first book, *Die Paläographie als Mittel der Sprachforschung*, written in Paris (1834),



The Lepontine Alps.

No.	Name.	Ft.	No.	Name.	Ft.	No.	Name.	Ft.	No.	Name.	Ft.
1.	Simplon Pass.....	6,595	10.	Mt. Basodino.....	10,749	19.	Pizzo Campo Tencia.....	10,089	28.	Splügen Pass.....	6,945
2.	Mt. Leone.....	11,686	11.	Gries Pass.....	8,038	20.	Uomo Pass.....	7,258	29.	Mt. Cistella.....	9,450
3.	Kaltwasser Pass.....	9,351	12.	Nufenen Pass.....	8,006	21.	Lukmanier Pass.....	8,390	30.	Sonnenhorn.....	9,144
4.	Helsenhorn.....	10,742	13.	Pizzo Rotondo.....	10,489	22.	Pizzo Medel.....	10,509	31.	Bortelhorn.....	10,482
5.	Geisalp Pass.....	8,120	14.	Cavanna Pass.....	8,566	23.	Lentalücke Pass.....	9,692	32.	Mt. Giove.....	9,372
6.	Albrun Pass.....	7,907	15.	St. Gothard Pass.....	6,996	24.	Rheinwaldhorn.....	11,149	33.	Pizzo Cristallina.....	9,547
7.	Otenhorn.....	10,637	16.	Pizzo Centrale.....	9,853	25.	Valserberg.....	8,325	34.	Mt. Cramalina.....	7,612
8.	Hohsaud Pass.....	9,603	17.	Six Madun Badus.....	9,619	26.	San Bernardino Pass.....	6,770	35.	Mt. Zuchero.....	8,980
9.	Blindenhorn.....	11,103	18.	Unteralp Pass.....	8,301	27.	Pizzo Tambo.....	10,749	36.	Weisshorn.....	9,990
							Pizzo Aul.....	10,250			

form part of this range. See Conway and Coolidge's *Climbers' Guide to the Lepontine Alps* (1892), and *Guide to the Adula Alps* (1893).

Leprosy (Gr. *lepros*, 'scaly' or 'rough') is a disease caused by the bacillus lepræ, and characterized by nodules or tubercles on the skin, or by anæsthetic changes in the nerves. Leprosy is very widely spread, and at one time was common in Europe, but it has now died out there except in Norway and Turkey. By some authorities it is believed to be communicated by contagion; while others favour the view that a fish diet has some influence in creat-

ing the mucous membranes become involved, so that the nodules are present in the mouth or larynx. In the latter case they may cause œdema, and lead to a rapidly fatal result. Blindness is a frequent concomitant of leprosy. When the purely anæsthetic form of leprosy exists, the disease has little resemblance to the other variety. It usually manifests itself first by pains in the limbs, which are soon succeeded by numbness or by absolute loss of sensation. The nutrition of the tissues suffers severely, and is shown by the formation of bullæ and spots, which later may break down into deep necrotic ulcers.

and published in Berlin, obtained the Volney prize of the French Institute. His *Lettre à M. Rosellini sur l'Alphabet Hiéroglyphique* was written in Rome (1837), where he also studied the ancient Etrurian and Oscan languages, and wrote *Inscriptiones Umbricæ et Oscæ* (1841). In 1842 he was charged with the Prussian scientific mission to Egypt and Nubia; the result of his researches appeared in *Denkmäler aus Ägypten und Ethiopien* (1849-60). Appointed professor in Berlin (1846), he led the way to a fuller scientific knowledge of Egyptian history with his *Chronologie der Ägypter* (1849) and *Ueber den*

ersten Ägyptischen Götterkreis (1851). He wrote numerous other philological works; was a member of the Royal Academy, and a director of the Egyptian section of the Royal Museum. See Ebers's *Richard Lepsius, ein Lebensbild* (1855; Eng. trans. 1887).

Leptinella, a genus of hardy herbaceous plants, order Compositae, natives of Australia and New Zealand. A few of the species are cultivated in gardens. They have small yellow flower-heads and pinnate leaves. *L. dioica* is the best known species, being much grown as a carpet plant. *L. lanata* and *L. plumosa* are two other hairy-leaved species.

Leptis. (1.) MAGNA, or NEAPOLIS, the modern Lebda, seapt., N. coast of Tripoli, Africa. It was a Phœnician colony, and possessed a flourishing commerce. (2.) L. MINOR, city in N. Africa, a little N. of the ancient Thapsus in Tunis. It was a Phœnician colony. See Davis's *Ruined Cities within Numidian and Carthaginian Territories* (1862).

Leptospermum, a genus of half-hardy shrubs, order Myrtaceae. They are natives of Australasia, and several of the species are grown under glass in this country. They have small, hard leaves, and bear white flowers. Among the species are *L. flavescens*, *L. attenuatum*, *L. myrtifolium*, *L. laevigatum*, and *L. scoparium*. The leaves of *L. lanigerum* were used by the early settlers in Tasmania as a substitute for tea leaves.

Lepus, an ancient constellation situated beneath the feet of Orion. a Leporis, called by the Arabs *Arneb* (the 'Hare'), is of 27 magnitude, and of an advanced Sirian type. Hind's 'crimson star,' R Leporis, varies from 6.0 to 8.5 magnitude in 436 days, and gives a spectrum marked by carbon absorption.

Le Queux, WILLIAM (1864), English novelist, born in London; educated in London and Italy, and studied art in Paris. On his return to London he became editor of *Gossip and Piccadilly*, and sub-editor of *The Globe* (1891-3). He is British consul in San Marino. Among his numerous novels are *Strange Tales of a Nihilist* (1890); *The Great White Queen* (1896); *The Day of Temptation* (1897); *England's Peril* (1899); *The Ticken-cote Treasure* (1902); *Secrets of the Foreign Office* (1903); *The Mask* (1904); *The Czar's Spy* (1905); *Confessions of a Ladies' Man* (1905); *Who Giveth this Woman?* (1905); and *A Spider's Eye* (1905).

Lercara, tn. in Palermo prov., Sicily, Italy, 28 m. s.s.e. of Palermo; has sulphur mines. Pop. 14,000.

Lerici, seapt. and summer resort, in prov. of Genoa, Liguria, Italy, 4 m. s.e. of Spezia; has silver and lead mines, and refineries. Pop. (1901) 9,026.

Lerida. (1.) Province, Spain, in s. part of principality of Catalonia. Watered by the Ebro and its tributaries, it is a prosperous and advanced agricultural country. There are 324 townships. Area, about 4,770 sq. m.; pop. 300,000. (2.) (Anc. *Ilerda*), cap. of above prov., on the Segre R., trib. of the Ebro, 80 m. w. of Barcelona, on the railway to Saragossa. The city contains a 13th-century cathedral, built in a strange mixture of the Byzantine, Gothic, and Moorish styles, and the 12th-century church of San Juan. Manufactures wool, cotton, silk, leather, and glass. Pop. (1900) 21,352.

Lerins, ILES DE, group of isls. in the Mediterranean, about 2 m. off the s. coast of dep. Alpes-Maritimes, France, comprising Sainte-Marguerite, Saint-Honorat, and other smaller islands. In the fort of Sainte-Marguerite Bazaine was imprisoned. Saint-Honorat has the remains of a monastery founded in the 4th century.

Lerma, RIO DE, SEE MEXICO.

Lermontoff, MIKHAIL YUREVITCH (1814-41), Russian poet and novelist, of Scottish descent, born at Moscow; became an officer in the Russian army. The death of Pushkin inspired his first poem. This incurred the displeasure of the Czar, who sent him to serve in the Caucasus, where the remainder of his life, except from 1838 to 1840, was spent. He was killed in a duel. The best edition of his works is that published by Viskovatoff (1891). See Macher-ski's *Les Poètes Russes*.

Lernæidæ, a family of copepod crustaceans, in which the female is parasitic on fish and very degenerate. The members of the family are often called fish-lice.

Leros, isl. in the Sporades, Ægean Sea, 32 m. s. of Samos, Marina or Leros. Area, about 25 sq. m.; pop. 4,000.

Leroux, HENRI or HUGUES (1860), French journalist and novelist, born at Havre. He was early interested in social subjects, and his articles in *Le Temps* and *Le Journal*, as well as his various novels, display an intimate knowledge of the life of the 'submerged tenth.' Among his works are *La Russie Souterraine* (1885), *L'Attentat Sloughine* (1885), *L'Enfer Parisien* (1888), *Marins et Soldats* (1892), plays, and travel sketches.

Leroy-Beaulieu, HENRI JEAN BAPTISTE ANATOLE (1842), French publicist, was born at Lisieux. His *Essai sur la Restauration de*

nos Monuments historiques devant l'Art et devant le Budget (1866) was followed by *L'Empire des Tsars et les Russes* (1881-9); *La France, La Russie et l'Europe* (1888); *La Révolution et le Libéralisme* (1890); and *La Papauté, le Socialisme et la Démocratie* (1893). In 1881 he became professor of modern history at the Ecole Libre des Sciences Politiques.

Leroy-Beaulieu, PIERRE PAUL (1843), French political economist, brother of preceding, was born at Saumur. He was appointed professor of finance in the School of Political Sciences, Paris (1872), a member of the Academy of Moral and Political Sciences (1878), and professor of political economy in the College of France (1880). Leroy-Beaulieu became the leading free-trade exponent in France, and founded the *Économiste Français* (1873) to give utterance to his views. For his treatise *De l'État Social et Intellectuel des Populations Ouvrières* (1868) he was crowned by the Academy. He published *De la Colonisation chez les Peuples Modernes* (1873), *L'État Moderne et ses Fonctions* (1889; 3rd ed. 1900), *Traité théorique et pratique d'Économie politique* (1896; 3rd ed. 1900), and *Le Sahara, le Soudan et les Chemins de fer Trans-sahariens* (1904).

Lerwick, cap. of the Shetland Is., Scotland, on the E. coast of Mainland, on Bressay Sound, 115 m. N.E. of Kirkwall, Orkney, and 340 m. by steamer from Leith. Exports fish, ponies, sheep, cattle, and knitted goods. The shores of the sound are fringed with herring-gutting and packing stations. Lerwick is the seat of the law courts; and Fort Charlotte, at the N. end of the town, is an important Royal Naval Reserve station. Pop. (1901) 4,061.

Lesage, ALAIN-RÉNÉ (1668-1747), French author, was born at Sarzeau, in Brittany. He went to Paris, studied law, and became a member of the bar. In 1743 he retired to Boulogne-sur-mer. Lesage may be called the first French 'man of letters,' in the modern sense of the term. He resembled the writers of the 17th century, with whom he had much more in common than with Voltaire and his set.

Lesage wrote two novels of note and merit—*Le Diable boîteux*, and *Gil Blas*; also one play, *Turcaret*. His other works have fallen into merited oblivion. *Turcaret* is the first work in which a cruel realism makes its appearance. *Le Diable boîteux* is a novel whose title and scheme are both taken from the Spanish writer Guevara. *Gil Blas* is on the same lines as *Le Diable boîteux*, but is larger in scope. It is certain that Lesage took the idea of the book.

from the *Marcos Obregon* of Vincente Espinel, as also the scheme and some of the adventures. The first part of the novel was written during the closing years of the reign of Louis XIV., and published in 1715. The second part appeared in 1724, and the third in 1735. Gil Blas is the type of the *bon-nête homme* who becomes so after experience that dishonesty is not the best policy.

What is chiefly remarkable about Lesage is his style, which is natural to the point of negligence, and yet is more carefully wrought than one thinks at first. It is light, and yet strong; lively, and full of pith and point. It is by that he will live. He is the true-begotten child of Molière, and has no 18th-century marks about him. See Lintilhac's *Le Sage* ('*Grands Ecrivains Français*'); Lanson's *Histoire de la Littérature Française* (1896); Doumic's *Histoire de la Littérature Française* (1900).

Lesbos. See MYTILINI.

Leschenaultia, a genus of Australian herbs and shrubs, order Goodeniaceae, including some of our most popular and beautiful greenhouse plants. *L. biloba* bears beautiful corymbs of blue flowers; *L. formosa*, solitary scarlet flowers; *L. unarioides*, yellow flowers; and *L. chloranthos*, solitary greenish flowers.

Lescot, PIERRE (c. 1510-78), famous French architect of the renaissance, of whose early life there is no record. His plans for the Louvre were carried out by himself and his friend, the sculptor Jean Goujon (1540-8). He was rewarded by many ecclesiastical gifts, and became counsellor to François I., Henri II., François II., and Charles IX. See Palustré's *La Renaissance en France* (1880).

Lesghians, one of the names (Lesghs, Lezghines, Leks, and Lek) applied to the collection of petty tribes which, along with the Tchechenzes, inhabit Daghestan ('Highlands') in the Caucasus. They number some 600,000, and include the Avars, Kurins, and many smaller and wilder tribes. They are a people of fine features and physique, even for Caucasians, of high intelligence, and industrious. They proved their daring and endurance during their thirty years' struggle with Russia. The capture of their famous leader Shamyl, in 1859, brought their independence to an end. In religion they are Mohammedan Sunnites.

Lesina, isl., Austria, off the Dalmatian coast, in 43° 10' N. lat.; produces dates, figs, and wine. Area, 120 sq. m.; pop. (1900) 18,010. The chief town, of the same name, is a bishop's see, a seaport, and a health resort. Pop. (1900) 3,820.

Leskovac, tn., Vranja co., Servia, on the l. bk. of the Bulgarian Morava. Trade in hemp and cloth. Pop. 12,000.

Leslie, tn. on river Leven, and par. of W. Fifeshire, Scotland; has paper and flax mills. The old church is claimed to be the original 'kirk' of James I.'s poem *Christ's Kirk on the Green*. Pop. (1901) 3,587.

Leslie, ALEXANDER, FIRST EARL OF LEVEN (?1580-1661), Scottish general, was descended from the Leslies of Balquhan, his father, George Leslie, being captain of Blair Castle in Atholl. Though he received but a scanty education, and joined the army of Gustavus Adolphus as a common soldier, he rose to be lieutenant-general some time before 1626, when he was made a knight. During the Thirty Years' war he held the chief command under Gustavus. He raised the siege of Stralsund (1628), and for his brilliant feats against Wallenstein received many rewards and honours. After the death of Gustavus at Lutzen (1632), he continued in the Swedish service, and in 1636 his achievements were rewarded by the rank of field-marshal. When the Covenanters resolved to withstand by force of arms the ecclesiastical policy of Charles I. (1638), Leslie obtained leave to return to Scotland, where with great energy he set himself to organize offensive and defensive preparations. On Charles setting out in person against Scotland, he was named lord general of the Scottish forces on land and sea; and in June 1639 he advanced southwards with an army of thirty thousand to Duns Law, this bold attitude leading to a treaty of pacification. On the resumption of hostilities (1640), Leslie advanced to Newcastle, of which he retained possession until the treaty of Ripon, Aug. 7, 1641. On the visit of the king to Scotland he was, on November 9, created Earl of Leven and Lord Balgonie. After an uneventful campaign in Ireland (1642), he returned to Scotland, and in 1644 he was appointed general of the Scottish army sent to the support of the English Parliament. Some time afterwards he successfully stormed Newcastle; and after the capture of Charles (1646), he retained him there until his delivery to the English Parliament (1647). He served as a volunteer against Cromwell at Dunbar (1650), and was afterwards captured by General Monck (1651), and confined for some time in the Tower. He died at Balgonie, Fifeshire. See Sir William Fraser's *The Melvilles Earls of Melville, and the Leslies Earls of Leven*; Terry's *The Life and Campaigns of Alexander Leslie, First Earl of Leven* (1899).

Leslie, CHARLES (1650-1722), Irish non-juring divine and controversialist, born at Dublin; took holy orders (1680), becoming chancellor of Connor (1686). A zealous Protestant as well as a Jacobite, he lost his chancellorship for refusing to acknowledge William III. He accompanied the Pretender to Italy (1713), returning in 1721. He wrote many political and theological pamphlets, his *Short and Easy Method with the Jews* (1699) being the most notable. See *Life* by R. J. Leslie (1885).

Leslie, CHARLES ROBERT (1794-1859), English painter, of American descent, born in London. He worked under West and Allston in the Royal Academy schools. His *Sir Roger de Coverley going to Church* (1819), the first of his great series of drama-pictures, ensured his election as A.R.A., and full honours followed (1826). Queen Victoria commissioned him to paint her coronation and the christening of the Princess Royal. In 1848 he was elected professor of painting at the Royal Academy, his lectures being printed (1853). He had previously written *Memoirs of the Life of John Constable* (1843), and begun his *Life and Times of Sir Joshua Reynolds* (1865). There are fine examples of his pictures in the Tate Gallery and the South Kensington Museum. See his *Autobiographical Recollections* (1860), and Dafforne's *Pictures of C. R. Leslie* (1872).

Leslie, DAVID, LORD NEWARK (d. 1682), Scottish general, was the fifth son of Sir Patrick Leslie of Pitcairly, Fifeshire. He gained a special knowledge of war under Gustavus Adolphus, but returned to Scotland to aid the Covenanters against Charles I., when he served as major-general under Alexander Leslie, Earl of Leven, at Marston Moor (1644). In 1645, by a rapid movement, he surprised and almost annihilated the forces of Montrose at Philiphaugh; and it was to him that Montrose, when he reappeared as the champion of Charles II., owed his defeat and capture. On Charles II. obtaining the support of the Covenanters, Leslie, under the nominal superintendence of the Earl of Leven, had command of the army raised on his behalf. For some time he completely outmanœuvred Cromwell, and the disaster at Dunbar (1650) was doubtless caused by the incompetent urgency of the Committee of Estates. He also displayed skill in delaying Cromwell's progress northwards; and though his march on London ended in overwhelming defeat at Worcester, he did at least the best he could for a cause that had become hopeless. After Worcester he was detained

a prisoner in the Tower until the restoration. He was created Lord Newark (1661). See Gardiner's *History of the Great Civil War*, and his *History of the Commonwealth and Protectorate*; Colonel Leslie's *Historical Records of the Family of Leslie* (1869).

Leslie, FRED (1856-92), English burlesque actor, whose real name was Frederick Hobson, was born in London. He first appeared there at the Royalty as Colonel Hardy in *Paul Pry* (1878). His interpretation of the title rôle in Planquette's opera *Rip Van Winkle* made him famous. After 1885 he played at the Gaiety, in association with Nellie Farren, confining himself to burlesque, in which he had no equal. See *Recollections* by Vincent (1894).

Leslie, SIR JOHN (1766-1832), Scottish mathematician and natural philosopher, was born at Largo. He went as tutor to Virginia for two years (1788); and from 1790 till 1805 occupied himself with teaching, travelling, writing, and research. He translated Buffon's *Natural History of Birds* (1793), and invented the differential thermometer and a photometer. His treatise on the *Nature and Propagation of Heat* (1804) obtained the Royal Society's Rumford medal. He became professor of mathematics at Edinburgh (1805), and professor of natural philosophy (1819). The invention of his hygrometer led to the discovery of artificial freezing (1810). His *Elements of Natural Philosophy* appeared in 1823. See Napier's *Memoir* (1838).

Leslie, or LESLEY, JOHN (1527-96), Scottish prelate, statesman, and historian, the illegitimate son of Gavin Lesley, rector of Kingussie, Inverness-shire. After graduating M.A. in King's College, Aberdeen, he went to the Continent to study theology and civil law in Paris and Poitiers, and he graduated doctor of civil law in Paris (1553). Some time after his return to Scotland he was admitted to holy orders, and was inducted to the parsonage, canonry, and prebend of Oyne, Aberdeenshire (1559). He became professor of canon law in Aberdeen (1562), and an ordinary judge of the Court of Session and a member of the Privy Council (1565). After Queen Mary's marriage to Darnley he received the abbacy of Lindores, and he was presented to the see of Ross (1566). Though opposed to the Bothwell marriage, he continued to retain the queen's confidence, and after her flight into England was her chief legal adviser in the negotiations with Elizabeth. He for some time represented the interests of Mary at the court of Rome, whence he was sent by the Pope on various

missions on her behalf. He became suffragan and vicar-general of the diocese of Rouen (1579), and was appointed to the bishopric of Constance in Normandy (1591); but the distracted state of the country made it impossible for him to obtain possession of it, and he died in an Augustinian monastery near Brussels. Leslie is now best known by his histories of Scotland: that in the vernacular, from the death of James I. to 1561, written for Queen Mary's perusal, and printed by the Bannatyne Club (1830); and the Latin history, entitled *De Origine, Moribus, et Rebus Gestis Scotorum* (1578), the most valuable portion of which is the contemporary description of Scotland and its inhabitants. A Scottish translation made in 1596 was printed by the Scottish Text Society (1884-91). See *Letters of Mary Queen of Scots*, edited by Labanoff (1839); Irving's *Lives of Scottish Authors* (1801); Father Cody's Introduction to the Scottish translation of Leslie's *Latin History* (Scottish Text Society, 1888).

Lespinasse, JULIE JEANNE ELÉONORE DE (1732-76), natural daughter of the Countess d'Albon, a leader of French society, was born at Lyons. Being early left unprotected, she went to reside with the Marquise du Deffand. Here her brilliant wit and originality attracted the attention of D'Alembert, Turgot, and Marmon-tell, and others of the marquise's circle soon transferred their allegiance to her, and her salon became famous. Her charming letters to her lover, the Comte de Guibert, were published in 1809. See *Lettres Inédites de Mlle. de Lespinasse* (1887).

Lesseps, FERDINAND, VICOMTE DE (1805-94), French diplomat, cousin of the Empress Eugénie, was in the consular service at Lisbon (1828) and at Alexandria, where he received the Cross of the Legion of Honour for heroic conduct during the plague (1834-35). He also served at Tunis, Cairo, and Madrid. In 1854 he inaugurated the Suez Canal scheme, which, on account of British opposition to the work, was not begun till 1860. The canal was finished in 1869. For this he received the Grand Cross of the Legion of Honour and an English knighthood. In 1881 he commenced the Panama Canal on insufficient funds, and in 1892 the management was charged with fraud, and De Lesseps was condemned to five years' imprisonment, but was too ill to undergo the sentence. He wrote *Lettres, Journal, et Documents pour servir à l'Histoire du Canal de Suez* (1875; trans. 1876), and *Souvenirs de Quarante Ans* (1887).

Lesser Antilles. See WEST INDIES.

Lessing, GOTTHOLD EPHRAIM (1729-81), German critic and dramatist, born at Kamenz, Upper Lusatia, where his father was pastor primarius. Proceeding to the University of Leipzig to study theology (1746), he soon drifted to the literary and philosophical lectures. After spending the summer of 1748 at Wittenberg, he went to Berlin. At first he was compelled to undertake whatever literary work presented itself, for a mere living; he worked for the papers, translated, and wrote plays. In 1752 he went to Wittenberg and took his M.A. degree. On his return to Berlin he studied particularly English and Latin literature, and gave the first striking example of his critical gifts in the *Vademecum für den Herrn S. G. Lange* (1754). In 1755 he published his first important drama, *Miss Sara Sampson*, described as a *bürgerliches Trauerspiel*, which shows the influence of English models. During a short stay at Leipzig he made the acquaintance of Christian Ewald von Kleist, and wrote the patriotic play *Philotas*. Lessing's third stay in Berlin (1758-60) is marked by the publication of the *Briefe die neueste Litteratur betreffend*, of which Lessing wrote fifty-four, and his friend, Friedrich Nicolai, the remainder. He also wrote his *Abhandlung über die Fabel und Fabeln*, remarkable for their conciseness. When secretary to General von Tauenzien, the governor of Breslau (1760-5), he saw something of the Seven Years' war; and gathered the materials for his *Minna von Barnhelm*. In 1766 appeared his *Laokoon*, which overthrew the Horatian precept *ut pictura poesis*, a source of many errors in the works of the Zürich writers and their numerous followers. In the following year he published *Minna von Barnhelm*, the first of all German comedies, and still without a rival. Lessing, who had failed to obtain the post of librarian to Frederick the Great, accepted an invitation to Hamburg, where he was to direct and elevate the theatre. His criticisms of the actors and of the plays performed were collected under the title of *Hamburgische Dramaturgie* (1768-9). His knowledge of classical antiquity and scholarly methods were apparent in the *Briefe antiquarischen Inhalts* (1768) and the beautiful essay *Wie die Alten den Tod gebildet*. He next went to the little town of Wolfenbüttel as librarian to the Duke of Brunswick (1770), and wrote his fine tragedy *Emilia Galotti* (1772); while in 1774 he published, under the title *Fragmente eines*

Ungeannten, some extracts from the manuscripts of Professor Reimarus, a freethinker, concerning the credibility of the New Testament, which led to a stormy and prolonged controversy with the orthodox Lutherans, headed by Pastor Goeze of Hamburg. Lessing showed the weakness of their polemics in a number of brilliant pamphlets, until, in 1778, the Duke of Brunswick prohibited him from issuing any more. He returned to 'his old pulpit, the stage,' and preached an enlightened religion and a broad tolerance in the noble dramatic poem *Nathan der Weise* (1779). In 1780 he summed up his views on the progressive character of religion in mankind in *Die Erziehung des Menschengeschlechts*, a fitting conclusion to his strenuous lifework. Lessing's grand sincerity and independence of character, and the unique combination of critical and creative powers seen in his works, make him the greatest German writer since Luther. Goethe and Schiller looked up to him and learned from him, and to many he is still one of the world's great leaders. A considerable literature has grown up around him and his works. These were edited by K. Lachmann (re-edited by Fr. Muncker) in 15 vols. (1886-1900). There is another edition, in 14 vols., by R. Boxberger and H. Blümner in Kürschner's *Deutsche National-Literatur*. See biographies by Danzel and Guhrauer (1850-4), Erich Schmidt (1884), Borinski (1900); in English—Sime (1877), Helen Zimmern (1878), and Rolleston (1889); in French—E. Gruckler (1896); and *Lessing als Reformator der Deutschen Literatur*, by Fischer (1881).

Lesson, or **LECTION**, a portion of holy Scripture or other religious matter read at divine service. The word is principally applied to the part of the Old Testament called 'the first lesson,' and to that of the New Testament termed 'the second lesson,' set down in the Church of England Prayer Book to be read at morning and evening prayer. In the Greek Church the daily offices contain no lessons from Scripture, although the worshippers read the gospel on Sunday mornings both in the office and in the liturgy.

Leste is the name applied to the hot, dry easterly wind of Madeira, and corresponds to the *sirco* of Algeria and the 'brickfielders' of S. Australia. Its occurrence is uncertain, many months sometimes elapsing between the visitations. The temperature when it is blowing sometimes reaches 90° in the shade, and the relative humidity may fall to 20 per cent.

Lestock, RICHARD (?1679-1746), British admiral. Entering the navy, Lestock became a captain (1706), and served in the battle off Cape Passaro (1718), in the W. Indies (1741), in the Mediterranean (1742), and was present with Mathews at the battle off Toulon (1744). Lestock, who was made a full admiral (1746), the same year conducted an expedition to the coast of Brittany. See Clowes's *The Royal Navy* (1897-1903), Mahan's *Influence of Sea Power* (1890).

L'Estrange, SIR ROGER (1616-1704), English pamphleteer, was born at Hunstanton, Norfolk. L'Estrange accompanied Charles I. to Scotland (1639), was imprisoned in Newgate for complicity in a plot to seize Lynn Regis (1644), escaped to the Continent (1648), where he remained till pardoned by Cromwell in 1653. During the protectorate he issued many anonymous writings on the political situation. Under Charles II. and James II. he was a stern licenser of the press and a rough pamphleteer, displaying what Bishop Burnet called 'unexhausted copiousness in writing.' After the revolution he lost his office of licenser, and between 1688 and 1696 was several times imprisoned as a suspect. His scholarly tastes and accomplishments are revealed in his translations of Quevedo's 'Visions' (1667), Cicero's *De Officiis*, and Erasmus's *Colloquia* (1680), Æsop's *Fables* (1692), Seneca's *Moralia* (1693), and *Josephus* (1702); his *Memento*, in defence of the monarchy (1662); and his *Brief History of the Times*, exposing Titus Oates (1687).

Le Sueur, EUSTACHE (1617-55), French painter of historical and sacred subjects, born in Paris. His pictures are invariably characterized by nobility of sentiment and excellent draughtsmanship and composition, but the colour is, as a rule, feeble and artificial. His best works are in the Louvre, notably his *Prédication de Saint Paul à Ephèse* and *La Messe de Saint Martin*.

Lethe, in ancient Greek mythology, the river in the lower world from which departed spirits drank to obtain forgetfulness of the past; the name itself means forgetfulness.

Leti, GREGORIO (1630-1701), Italian writer, born at Milan, proceeded to Geneva, where he became a Protestant, and finally settled at Amsterdam as historiographer of the city. Among his general works, the most important are the elaborate accounts of England (*Del Teatro Britannico*, 1683) and of Geneva (English version, 1681). His biographies include those of Pope Sixtus V. (1686; Eng. trans. 1754), Queen Christina

of Sweden, King Philip II., the Emperor Charles V., Queen Elizabeth of England (1692), and Oliver Cromwell (1692). See Cameron's *Uno Scrittore Avventuriero del sec. XVII.* (1893).

Leto, called Latona by the Romans, was, in ancient mythology, a daughter of the Titan Cœus and Phœbe. Zeus loved her, and by him she became the mother of Apollo and Artemis. She was generally worshipped in conjunction with her children.

Letter of Attorney. See POWER OF ATTORNEY.

Letter of Credit. See BANKER—*Banker and Customer*.

Letters. See ALPHABET, PHONETICS, and A, B, etc.

Letters, or epistolary writing, may be regarded as constituting in the main one of the most attractive forms of literature. When a man addresses himself to the general public, whether in speech or writing, he inevitably suffers to some extent from the constraint of self-consciousness. But in letters written without the slightest thought of publication, as the best letters are, there are an easy charm and a naturalness which appeal to all. Some of the most delightful correspondence comes from the pens of people who are not, in the ordinary sense, literary at all. The genuine nature of the writer comes out conspicuously under such conditions; as in the artless effusion of James VI. of Scotland, written from the court of Denmark, where he announced himself to be 'drinking and driving oar,' or in the boyish letters of his son Charles. This ingenuous frankness is also apparent in the celebrated collection known as *The Paston Letters* (ed. by Gairdner, 1904). These letters were written (1422-1509), mostly to or by members of the Norfolk family of Paston (afterwards Earls of Yarmouth), by whom they were preserved, being eventually published, for the first time, in 1823. Besides throwing considerable light upon historical matters and English life during the reigns of Henry VI., Edward IV., and Richard III., they are alive with the personal element which is the chief attraction of unstudied correspondence. It is for this reason that published letters, if selected and edited with judgment, always find numerous readers. The *Letters of Jane Welsh Carlyle* (1883, 1889) and the *Vailima Letters* (1895) of R. L. Stevenson may be named as two of the most interesting collections of recent times in the English language. The epistolary form has been frequently selected as a vehicle for didactic and political purposes. For example, the religious teaching of the early

Christian apostles, as preserved at the present day, is for the most part conveyed in this shape. The direct address has an efficacy not easily attained in an impersonal treatise. Although devoted to the teaching of worldly wisdom, the *Letters of Lord Chesterfield to his Son* (1774-87) afford another instance of the choice of this method. In his *Letters of Malachi Malagrowther* (1826), Sir Walter Scott found an effective weapon for achieving a patriotic and political purpose; in *Paul's Letters to his Kingsfolk* (1815) he anticipated the brilliant war-correspondent of to-day. The advantages of the epistolary method may be held to be abused, however, in what is called the 'open letter.' The autograph letters of celebrities often bring large prices. In 1904 a letter written by Nelson to Lady Hamilton realized £1,030 at a sale in London; and in 1905 an unfinished and unsigned letter of Mary Queen of Scots brought £900, also in London.

Letters Missive. Since 1854, when a vacancy occurs in a bishopric, the King grants to the dean and chapter a licence under the Great Seal to elect a bishop, coupled with a letter missive telling them whom to elect. Formerly a peer cited as defendant in a Chancery suit was served by the Lord Chancellor with a letter missive.

Letters of Marque, a commission issued by a government, authorizing masters of merchant ships, privateers, and others to capture prizes and property on the high seas or in harbour, by way of reprisals for damage done. By the Declaration of Paris, the granting of letters of marque was abolished. See **PRIVATEERS**; **PARIS, DECLARATION OF**; also *Hall's International Law* (5th ed. 1904), and *Wheaton's International Law* (4th ed. 1904).

Letters Patent. See **PATENTS**.

Letter-wood, the mottled brown heart-wood of *Brosimum Aubletii*, a tree native to Trinidad. It is used as a veneer.

Lettres de Cachet. In France, before the revolution, the king had power to issue sealed letters to governors of prisons and others, authorizing them to arrest and detain the persons named therein. The letters were frequently issued by the king in blank, and distributed by the ministers to those who wished to rid themselves of troublesome relations. They were extensively employed by Richelieu, Mazarin, and Louis XIV., both for purposes of state and for private ends, and were abolished by the National Assembly (1789).

Letts. See **LIVONIA**.

Lettuce, an annual plant, *Lactuca scariola sativa*, a native of Eastern and Central Asia, and Southern Europe. It was introduced into England from Flanders about 1520. It has long been cultivated as a salad plant, and was grown by the ancient Greeks and Romans for this purpose. By careful treatment and selection of varieties, lettuces may be grown in the open air most of the year. There are two great classes, 'cabbage lettuces' and 'cos lettuces'—the former be-



Lettuce.

1, Cabbage lettuce; 2, cos lettuce.

ing distinguished by their broad leaves and low, spreading habit; the latter by their upright habit, and the oblong form of their leaves. The seed should be sown at intervals in a warm frame from January to early March, after which successional sowings may be made in a warm border. In September and October sowings may again be made in frames, so as to provide plants for early spring, but only sufficient protection is required to exclude frost. Air should be given whenever possible. Thinning should be early practised, an ultimate distance of nine inches being allowed from plant to plant.

Leucadendron, a genus of S. African trees and shrubs, order Proteaceæ. The best known species is *L. argenteum*, the silver-tree or wittebroom, with its beautiful, long, silvery-white leaves, well worth cultivating in Britain.

Leucine, or AMIDO-CAPROIC ACID, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CHNH}_2\text{COOH}$, found in several animal and vegetable juices. It is formed by the decomposition of albu-

minoids in digestion, or by the action of acids and alkalis, and occurs in fatty crystalline plates, slightly soluble in water.

Leucippus, a Greek philosopher, who probably flourished about the middle of the 5th century B.C. He is said to have invented the atomic theory expounded by his pupil Democritus.

Leuciscus, a genus of Cyprinidae, to which the general name of 'white fish' may be given. For examples, see **ROACH**, **DACE**, and **MINNOW**.

Leucite, potassium and aluminium silicate found in the lavas of Vesuvius, in which it forms white or ash-gray, rounded, many-faced crystals (h. = $5\frac{1}{2}$, sp. gr. 2.5), mostly embedded in a black crystalline rock. It is found also in Rhenish Prussia, Australia, N. America, and other parts of the globe. Leucite is interesting to the mineralogist because of its apparently anomalous structure and optical properties. At first glance its crystals would seem to belong to the cubic or isometric system; yet they are not isotropic, but in polarized light are seen to be built up of a complex series of intersecting lamellæ. These disappear when the section is heated to a temperature of about 500° C., and the crystal becomes isometric both in its external form and internal properties.

Leuckart, RUDOLF (1822-98), German zoologist, born at Helmsstedt. He became professor of zoology, first at Gießen (1850), and afterwards at Leipzig (1869). His most notable works are *Die Parasiten des Menschen* (1863-76), partly translated into English by Hoyle (1886), and *Die Anatomie der Biene* (1885).

Leucocoryne, a genus of half-hardy bulbous plants, order Liliaceæ. They bear few-flowered, terminal umbels of white or blue salver-shaped flowers. The two species most often seen are *L. ixoides* and *L. alliacea*, both natives of Chile.

Leucocrinum, the sand lily of Colorado, is a liliaceous genus containing the one species *L. montanum*. This is a dwarf-growing, hardy plant, bearing, close to the ground, clusters of white, funnel-shaped, fragrant flowers in early spring.

Leucocythæmia (Gr. *leukos*, white; *kytos*, cell; *haima*, blood), or **LEUKÆMIA**, is a disease characterized by great increase in the number of white corpuscles present in the blood, and generally by some decrease in the red corpuscles. Two forms are recognized, one of which is associated with changes in the spleen and the bone marrow, and is known as the spleno-medullary type. In advanced cases the spleen is

enormously enlarged. The other form is the lymphatic, which is accompanied by enlargement of the lymphatic glands throughout the body, and of the spleen to a less degree. While a few recoveries from leucocythæmia have been recorded, all forms of the disease are intractable, although many of them show temporary improvements or remissions. Arsenic and iron are the drugs which have proved to be of most service in all forms.

Leucoium, or SNOWFLAKE, a genus of hardy, bulbous plants, order Amaryllidaceæ. They have usually long, narrow leaves, and pendulous white flowers, remotely like those of the snowdrop. The principal species are *L. vernum*, which bears fragrant, white, green-tipped flowers in spring; *L. æstivum*, which flowers a little later; and *L. Her wandzii*, also a summer bloomer.

Leucoma, or ALBUGO (Gr. *leukos*, 'white') is an exceedingly dense white cicatrix which sometimes follows deep ulceration of the cornea. When situated near the centre of the pupil, it seriously impairs the vision of the affected eye. Should the ulceration be sufficiently deep to perforate the cornea, the iris not infrequently protrudes and becomes incorporated in the cicatrix, the condition then being known as leucoma adherens. Many corneal opacities clear up to some extent in the course of time, and should they be superficial, gentle massage of the eye accelerates their resolution. If, however, a leucoma is permanent, large, or centrally situated, it may interfere with vision to such an extent that iridectomy, or the making of an artificial pupil, is advisable should there be enough clear corneal tissue available for the operation.

Leucopogon, a genus of tropical and subtropical evergreen shrubs, order Euphorbiaceæ. They bear terminal axillary spikes of small white flowers. Most of the species are natives of Australia, among them being *L. verticillatus*, *L. Richei* (the native currant), a winter blooming kind, *L. australis*, also a winter bloomer, and *L. ericoides*.

Leucospermum, a genus of S. African evergreen shrubs, order Proteaceæ. They have hairy leaves and solitary sessile flowers. *L. medivum*, which bears hairy, orange-coloured flowers in early summer, and *L. grandiflorum* are the best species for greenhouse cultivation.

Leuctra, small tn. in Boeotia, ancient Greece, famous for the great victory gained in its neighbourhood by the Thebans over the Spartans (371 B.C.), which practically ended Spartan supremacy in Greece.

Leukas, or LEUCADIA, now called Santa Maura, isl. in the Ionian Sea, off the coast of Acarnania, in W. Greece, 46 m. S.E. of Corfu. It is about 20 m. long and 8 m. at most in breadth, and has an area of about 100 m. The chief products are currants, wine, and oil. Its capital is Amaxichi or Leukas, on the N.E. coast. Its name 'Whiteland' is due to the chalky nature of its hills, the highest of which attain to an elevation of 3,700 ft. Colonized by Corinthians about 650 B.C., they made it an island by cutting a canal through the narrow isthmus which connected it with the mainland.

Leukerbad, wat.-pl., with hot springs, canton Valais, Switzerland, at the S. foot of the Gemmi Pass, 9½ m. N. of the Upper Rhone valley. Alt. 4,629 ft. Pop. (1900) 600.

Leuthen, vil. of Lower Silesia, Prussia, 9 m. W. of Breslau, is noted for the victory gained on Dec. 5, 1757, by Frederick the Great over three times the number of Austrians, under Prince Charles of Lorraine. Pop. about 800.

Leutschau (Hung. *Lőcse*), chief tn. of co. Szepes, Hungary, 37 m. N.W. of Kaschau. In the middle ages it was an important trade centre. Pop. (1900) 6,845.

Leutze, EMANUEL (1816-68), German-American historical painter, born at Gmünd, Württemberg, educated in America, and studied art in Düsseldorf, making his home there until 1859, when he went to the United States, where he received a commission to paint *Westward the Star of Empire takes its Way* for the capitol at Washington. Among his other works are *Columbus before the Council at Salamanca* (1841), *Cromwell Visiting Milton*, and his *chef-d'œuvre*, *Washington Crossing the Delaware* (now in the Kunsthalle at Bremen).

Levaillant, FRANÇOIS (1753-1824), French ornithologist and traveller, born in Dutch Guiana. He undertook explorations in Central Africa (1781-5), and made collections of the birds and large mammals. The results of his researches appeared in *Voyage dans l'Intérieur de l'Afrique* (1790), *Histoire Naturelle des Oiseaux d'Afrique* (1796-1812), and *Histoire Naturelle des Oiseaux de Paradis et des Rolliers* (1806).

Levant (Ital. *Levante*, the 'sunrise'), a name first applied by the Italians to the Mediterranean Sea and the regions adjoining it to the E. of Italy. It now refers to the east end of the Mediterranean and the adjoining countries, whose inhabitants are designated Levantines. See Harts's *A Levantine Log-Book* (1905).

Levanter is the name applied to an east wind very prevalent on the African coast during the summer; evidently related to the north-east trade winds.

Levant et Couchant. In some commons the commoner may depasture on the common as many cattle ('levant et couchant'—i.e. by day and by night) as his holding will support in the winter. Also, a landlord may, after giving notice to the owner, distrain for rent cattle 'levant et couchant' on his tenant's land—i.e. trespassing thereon for twenty-four hours.

Leveche is the hot, dry southerly wind of Spain, which comes from the moderately high lands of Africa. It is of the nature of the sirocco, the atmosphere being very dry and full of fine dust particles.

Levéé (Fr. *lever*, 'to rise'), a morning reception held by the sovereign or his representative of those gentlemen whose rank or position entitles them to be present. The name is due to the fact that these receptions were first held by the kings of France in their dressing-rooms in the morning. A *levée* in Britain differs from a drawing-room in that only gentlemen are present.

Level. (1.) An instrument for obtaining the direction of a line parallel to the horizon, or testing the horizontality of surfaces. It depends in its various forms on the principle that the surface of a liquid at rest is horizontal. The water-level, which is the simplest variety of the instrument, consists of two glass phials fixed vertically at the ends of a straight metal tube, with which they communicate below. Coloured water is poured into the instrument so as to fill the tube and phials nearly to the top of the latter, so that if the tube is fixed in a nearly horizontal position on a stand, the true horizontal line will be the line of sight over the surface of the water in the two phials. Instruments based on the spirit-level are, however, much more accurate and convenient. The spirit-level



FIG. 1.—Spirit-level.

consists of a glass tube bent into a portion of the arc of a very large circle, filled all but a small bubble with alcohol, and mounted in a case so that the plane of the arc is vertical. As the bubble represents the free surface of the liquid, it seeks the highest position it can, which, when the instrument is horizontal, is in the middle of the tube, but when either end is raised, moves towards the higher side. For

rough purposes circular levels are sometimes employed, and consist of a brass case with slightly convex glass cover. The case is nearly filled with alcohol as before, and, in accordance with the above principle, is adjusted so

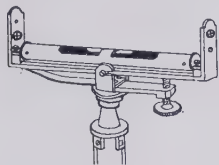


FIG. 2.—Y-level for Surveyors.

that the bubble is quite central when the level is on a horizontal surface. In levelling for surveying purposes, the spirit-level is fixed parallel to the axis of a telescope provided with cross hairs, and the latter directed to a vertical measure, or levelling staff, held first in one position and then in another, the difference of the readings observed on the staff giving the difference of

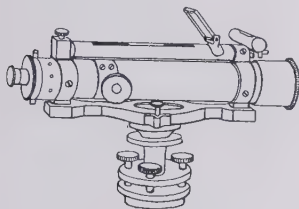


FIG. 3.—Level with Telescope.

level between the two points. The process can then be extended to as many points as may be required to give a measure of the contour of the area in question. See SURVEYING AND LEVELLING; THEODOLITE. (2.) A level in mining is a horizontal gallery run to connect shafts and to open the ground. See MINING.

Level Crossings. By the Level Crossings Act, 1839, the Railway Regulation Act, 1842, and the Railway Causes Consolidation Act, 1845, a railway company must erect gates at a level crossing over a public road, and keep them closed across the road, unless the Board of Trade allows them to be kept closed across the railway; and where the crossing adjoins a station, the speed must not exceed four miles an hour. These regulations do not apply to a private railway not made under the authority of an Act of Parliament.

Levellers, the name of an ultra-republican party in England during the civil war which was powerful in Parliament in the earlier years of the commonwealth. Dissatisfied with the form

of government established by the Parliamentarians after the death of Charles I., they broke out, in 1649, into open mutiny, but were suppressed by Fairfax.

Leven. (1.) Coast tn. and summer resort at mouth of the Leven, in Scoonie par., Fifeshire, Scotland, 6 m. N.E. of Thornton Junction; has fine golf links. Industries: flax-spinning, linen-weaving, seed-crushing, and coal-mining. Pop. (1901) 5,577. (2.) Loch, Kinross-shire, Scotland, 9 m. N.W. of Kirkcaldy, and overlooked by the hills of Benarty and West Lomond. Altitude, 350 ft.; length from N.W. to S.E., over $3\frac{1}{2}$ m.; breadth, from $2\frac{1}{2}$ m. to $1\frac{1}{2}$ m.; greatest depth, 83 ft. There are seven islands, of which St. Serf's, the largest, has ruins of

Levenshulme, tn., Lancashire, England, 3 m. S.S.E. of Manchester; has calico, bleaching, and printing works. Pop. (1901) 11,500.

Lever, one of the simple mechanical powers. It consists of a rigid rod or frame, one point of which, known as the fulcrum, is fixed in position. A force or pressure applied at some one point can always be balanced by an appropriate force or pressure applied at another point. The balance in its various forms is a lever; but perhaps the most typical example is the crowbar, by means of which large weights are overcome by use of comparatively small forces. To find the relation of the weight overcome to the power which overcomes it,



Loch Leven.

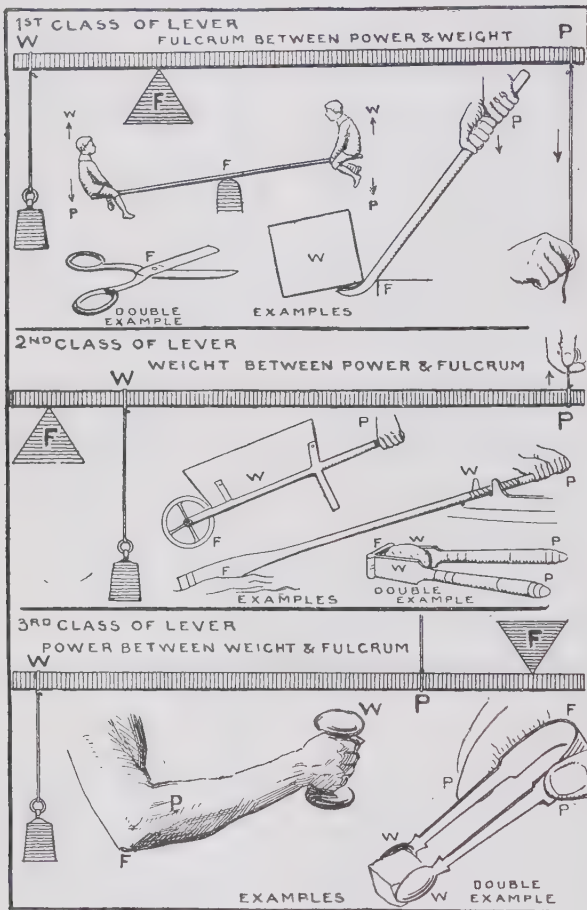
an 8th century priory; and Castle Island bears the ruins of the castle in which Mary Queen of Scots was imprisoned (1567-8). Loch Leven is famous for its trout, which are of a pink colour and a delicate flavour. See Burns-Begg's *History of Loch Leven Castle* (1877). (3.) Loch, branching E. from Loch Linnhe, and forming the boundary for $11\frac{1}{2}$ m. between Argyllshire and Inverness-shire, Scotland. The Leven flows in at its eastern extremity. To the S. lie the wild and romantic valley of Glencoe and the great slate quarries of Ballachulish. In 1901 an Act of Parliament was obtained to build embankments and raise the water level of several lochs near, and works are being constructed at Loch Leven to generate electricity on a large scale for manufacturing purposes by the water-power thus obtained.

we multiply each by its distance from the fulcrum. There are many forms of simple machines which come under the category of levers, such, for example, as scissors, nut-crackers, tongs, forceps, pincers, pump-handles, the two-pronged head of a hammer when used for drawing out nails, and so on. It will be noticed that there is no necessity for the fulcrum to be between the power and weight. Thus in nut-crackers, the fulcrum lies at the one end, the power is applied at the other, and the weight overcome lies between the ends but close to the fulcrum. The movements of the limbs, fingers, and head of the human body give many interesting illustrations of the action of levers. In the majority of cases, the power is applied by means of the appropriate muscle at a point close to the fulcrum. This effects great kinematical advantage in

the most economical way. The wheel and axle, the capstan, the crank, and other instruments, are all special types of what might be called continuously acting levers; and in the act of rowing, the oar is a lever, with fulcrum where the blade meets the water, and weight at the rowlock.

novels in rapid succession. His books are brilliant sketches of Irish life and character, full of rollicking humour, a wealth of anecdote, and a vivacity which rarely flags. A complete edition of his works (37 vols.) was issued by his daughter (1897-9). See *Life* by Fitzpatrick (1879).

Leveret. See HARE.



The three Orders of Levers, with examples of their application.

Lever, CHARLES JAMES (1806-72), Irish novelist, born at Dublin. After spending two years in Holland and Germany and making a visit to Canada, he settled down in his native city, and began to contribute fiction to the *Dublin University Magazine*. In that journal his first two novels, *Harry Lorrequer* (1839) and *Charles O'Malley* (1841), appeared as serials. In 1842 he became editor of the magazine, and from that time till 1872 he published

Leverrier, URBAIN JEAN JOSEPH (1811-77), French astronomer, was born at St. Lô, Normandy. Appointed professor of astronomy in the École Polytechnique, Paris (1837), he prosecuted Laplace's work in celestial mechanics. His *Tables de Mercure* were published in 1843. At Arago's bidding he attacked the problem of Uranus, and solved it by the discovery of Neptune, found from his indications, Sept. 23, 1846. Having entered the

Legislative Assembly (1849), he was named senator by Napoleon III., and became director of the Paris Observatory (1854). His uncompromising reforms excited hostility, and he was removed (1870), but was reinstated by Thiers in 1873.

Leverstin, OSCAR (1862), Swedish novelist and poet, *privat docent* at the University of Upsala since 1882. His earlier novels were materialistic, but his poems, *Legender och Visor* (1891) and *Nya Dikter* (1894), show him to be a true romanticist. As a critic he has produced some excellent work, his subject being the literature of the 18th century, especially the Gustavian period (e.g. *Gustaf III. som dramatiskt författare*).

Leveson, SIR RICHARD (1570-1605), English admiral, first became known by serving against the Armada (1588). He took part in the sack of Cadiz (1596), and in the following year joined the expedition known as the 'Islands' Voyage.' In 1602 he commanded a squadron on the coast of Spain, and captured a rich galleon from under the batteries of Cezimbra.

Levi. See LEVITES.

Levi, LEONE (1821-88), English jurist and economist, born at Ancona, Italy, of Jewish parentage; came to England (1844) and settled at Liverpool, where he taught political economy, and advocated the establishment of chambers of commerce. While secretary to the chamber in Liverpool, he collected material for his great work *Commercial Law of the World* (2nd ed. 1863), which led to the Mercantile Law Amendment Acts. His *History of British Commerce, 1863-70*, appeared in 1872 (2nd ed. 1880), and his *Annals of British Legislation* (1856-68).

Leviathan (Heb. *livyāthān*, probably from *livyah*, 'a wreath'—the wreathed or twisted animal), an aquatic monster (LXX., *drakōn*) mentioned several times in the Bible. Its description as given in Job 41 best fits the crocodile; and the reference in Ps. 74:14 is probably to the same, regarded as a symbol of Egypt or Pharaoh. But as the crocodile is not a sea-animal, the leviathan of Ps. 104:26 may be the whale; while Job 3:8 (R.V.; A.V. 'their mourning') seems an allusion to the dragon, which was believed to have the power of eclipsing the sun and moon. Cf. also Isa. 27:1.

Leviathan, a British first-class cruiser, launched in 1901. The ship-name, which dates in the navy from 1790, is associated with the operations at Toulon (1793), Howe's victory of the 1st of June (1794), the capture of Minorca (1798), and the battle of Trafalgar (1805).

Levis, or **POINT LEVI**, cap. of LEVIS co., Quebec, Canada, on the r. bk. of the St. Lawrence, opposite Quebec; has graving dock and extensive wharves. Pop. (1901) 7,783.

Levita, **ELIAS** (1465-1549), Jewish grammarian and exegete, born in Germany. When the Jews were expelled from that country he went to Italy, where he taught Hebrew. His writings include works on the Psalms, Job, Proverbs, and Amos, a Hebrew grammar, and a Talmudic and Targumic Dictionary. See his *Life* by Leir (1888).

Levites. Levi (derivation uncertain; Wellhausen regards it as a Gentile formed from Leah, the name of Levi's mother) was the third son of Jacob. According to Gen. 34:25, he joined with Simeon in avenging the dishonour of Dinah, an incident probably intended to represent some deadly affray in the Israelite conquest of Canaan, which, as the Shechemites were attacked in violation of a treaty, was severely condemned, and its perpetrators doomed to dispersion (Gen. 49:5). How the truculent tribe of Levi became the priestly order of the whole nation is probably to be explained by the personality and work of Moses, a Levite by birth, and the brother of Aaron, the founder of the priesthood. In the settlement of Canaan no territory was assigned to the Levites, but forty-eight cities were granted to them, and above all the privilege of serving the sanctuary, as being devoted to God instead of the firstborn (Num. 3:12). The three sons of Levi were Gershon, Kohath, and Merari, whose special tasks are detailed in Num. 3:17 ff. The development of the priesthood can be traced in the various codes of the Pentateuch: thus, in the Book of the Covenant (JE) any Israelite may act as priest (cf. Ex. 20:24 f.); in Deuteronomy the phrase is 'the priests, the Levites' (17:9)—i.e. the priests are identical with the Levites; in the Priestly Code, only Aaron and his sons are priests (Lev. 21, 22), while the Levites are inferior ministrants and the servants of Aaron (Num. 8:19). See Curtiss's *The Levitical Priests* (1877), Baudissier's *Geschichte des Alttest. Priesterthums*, and Hoonacker's *La Sacerdoce Lévitique*.

Leviticus, the third book of the Bible, derives its name, through Latin, from the Greek *Levítikon*, its Hebrew title being *Vayyikra* ('And he said'), its opening word. It is almost entirely concerned with the ritual of the Levitical system, and has been aptly called the literary monument of the Hebrew priesthood. The whole book is as-

signed by scholars to P (see **HEXATEUCH**), but with the proviso that this symbol indicates a school rather than a single writer, and various strata are discriminated. The law of holiness (Ph) is the oldest portion, and forms one of the three great legal codes of the Hebrews. Between it and Ezekiel many resemblances are traceable; and it probably attained its present form shortly after that prophet's time, the whole book being of still later date. See Commentaries by Keil (1870), Lange (1874), Strack (1894), Dillmann (ed. Ryssel, 1897), Bäntsch (1900), Bertholet (1901); see also literature at **HEXATEUCH**.

Levkosia. See **NICOSIA**.

Levuka, seapt. and former cap. of the Fiji Is., on the E. coast of the island of Ovalan.

Levulose. See **FRUCTOSE**.

Lewald, **FANNY** (1811-89), German novelist, a native of Königsberg, spent most of her life in Berlin, where she married Adolf Stahr, the author. Her novels were very popular, the most successful being *Diogenes*, *Roman von Iduna Gräfin Hahn-Hahn* (1847), *Von Geschlecht zu Geschlecht* (1863-5), *Die Erlöserin* (1873), *Neue Novellen* (1877), and *Stella* (1884). She was a strenuous advocate of woman's rights, and after travelling through Europe, wrote an interesting account of her journeys. Her autobiography, *Meine Lebensgeschichte*, was published in 1873.

Lewes, munic. bor. and co. tn., Sussex, England, on the Ouse, 8 m. N.E. of Brighton, and 7 m. from the port of Newhaven; is the site of a Saxon fortress, and has remains of a castle built by Earl de Warrenne (11th century), and of a Clugniac Priory. Trade in sheep, cattle, and farm produce. At Lewes was fought (1264) the battle in which Henry III. was defeated by Simon de Montfort. Area, 1,024 ac. Pop. (1901) 11,249.

Lewes, **GEORGE HENRY** (1817-78), English man of letters, born in London, the grandson of Charles Lee Lewis, a comedian of some repute. He studied medicine, but soon abandoned it for literature. His early writings were chiefly to periodicals. The most important were those on the drama, republished as *Actors and the Art of Acting* (1875). Lewes was editor of the *Leader* (1849-54), founded the *Fortnightly Review* (1855), and was for a time its editor. His connection with George Eliot, which commenced in 1854, only ended with his death. (See **ELIOT, GEORGE**.) Lewes's earlier works, including two novels, took no permanent place in literature; but after the assured success of George Eliot's *Scenes of Clerical Life* (1857), he,

no longer under the necessity of writing for immediate profit, turned his attention to biology and philosophy. The most important of his later works are *Seaside Studies* (1858); *Physiology of Common Life* (1859); *Studies in Animal Life* (1862); *Aristotle, a Chapter from the History of Science* (1864); *Problems of Life and Mind* (1874-9); *The Study of Psychology* (1879).

Lewis, riv. See **SNAKE RIVER**.

Lewis, **LEWIS-WITH-HARRIS**, or 'THE LEWS,' the most northerly island of the Outer Hebrides, Ross and Cromarty, and Inverness-shire, Scotland, separated from the mainland by the Minch. The greatest length is 60 m., average breadth 15 m. Area, 770 sq. m. It consists of two parts—Lewis Proper and Harris. The surface for the most part is peat and moss, and is almost treeless. Towards the N. it ends in precipitous cliffs, which form the Butt of Lewis. The shores are deeply indented, the principal openings being Broad Bay and Lochs Erisort, Seaforth, Resort, and Roag. The principal crops raised are barley and potatoes, and the chief industries are cattle-breeding and fishing. The only town is Stornoway. Pop. (1901) 32,160.

Lewis, **SIR GEORGE CORNEWALL** (1806-63), English politician and author, was born in London, and educated at Eton and Christ Church, Oxford. He was intended for the bar, and was one of the little band of able men who attended the famous lectures of John Austin. But he soon abandoned the bar for literature and politics. He passed in rapid succession through the post of special commissioner on the Irish Poor (1833), on Irish Education (1834), and in 1836 on the state of Malta (with John Austin), and finally succeeded his father as an English Poor Law Commissioner (1839). Returned to Parliament for Herefordshire (1847), his prospects of promotion still further improved, and he became secretary to the Board of Control (1847), under-secretary at the Home Office (1848), and financial secretary to the Treasury (1850). He was out of office and Parliament from 1852 till 1855, when he succeeded to his father's baronetcy, and sat for Radnor Burghs, being almost immediately appointed to the post of Chancellor of the Exchequer, whilst the Crimean war was raging. This post he held until the fall of Lord Palmerston's ministry (1858). On the return of Palmerston to power in the following year, he became Home Secretary, and, in 1863, the year of his death, Secretary for War. During his enforced retirement from politics

in 1852-5, Lewis was editor of the *Edinburgh Review*, contributing many articles to its pages. He resigned the editorship on entering upon office in 1855. He was the author of many works, the best known of which are *Essays on the Administrations of Great Britain from 1783-1830* (1864), *Remarks on the Use and Abuse of some Political Terms* (1832), *The Government of Dependencies* (1841), and *The Influence of Authority in Matters of Opinion* (1849). See his *Letters*, edited by his brother (1870), and *Bagehot's Literary Studies* (1879).

Lewis, Sir George Henry (1833), English criminal lawyer, belongs to a legal family of Jewish origin. He made his mark in a marine insurance case (1869), and was engaged for the prosecution in Overend and Gurney. In the many newspaper libels and society cases with which Sir George Lewis has been specially identified, he has frequently secured very heavy damages. Through a series of letters to the *Times* (1900), he has done much to rid the profession of fraudulent solicitors.

Lewis, Matthew Gregory (1775-1818), English author, often referred to as 'Monk' Lewis, was born in London. He was educated for a diplomatic career, and in 1794 went to the Hague as attaché to the British Embassy; and although his stay there lasted only a few months, it was marked by the production of *Ambrosio, or the Monk* (1795), a romance which achieved great popularity. His other works include a popular play (*The Castle Spectre*, 1798), translations of German romances, *Tales of Terror* (1799), and (with Scott's help) *Tales of Wonder* (1801). Two voyages to the W. Indies, to see the condition of the slaves there, led to the publication of *The Journal of a West Indian Proprietor* (1834). See *Life and Correspondence* (1839).

Lewis, William Thomas (1748-1811), English actor. At first a tragedian, it was as 'the lightest of light comedians' that he made his reputation. For twenty years he was seldom absent from Covent Garden. Absence of vulgarity in his style made him familiarly known as 'Gentleman' Lewis.

Lewisham, sub. (parl. bor.) of London, England, on Ravensbourne R., 4 m. S.E. of St. Paul's. It comprises several ecclesiastical parishes. Pop. (1901) 134,678.

Lewisia, a genus of dwarf N. American herbaceous plants, order Portulacaceæ, with only one species, *L. rediviva*, the bitter-root, whose starchy root is dug up by the Indians in spring and used as food. The plant has

thick fleshy leaves, which wither on the appearance of the large handsome pink and white flowers. It is hardy in Britain as a rock plant.

Lewiston, city, Androscoggin co., Maine, U.S.A., on riv. Androscoggin, at the falls, which furnish water-power for the manufacture of cottons, wools, and machinery. Pop. (1900) 23,761.

Lexicon. See DICTIONARY.

Lexington. (1.) City, Kentucky, U.S.A., cap. of Fayette co., situated in the centre of the famous blue-grass region, 98 m. S. of Cincinnati. It is one of the great horse markets of the world. Manufactures whisky, tobacco, hemp, and wagons. Pop. (1900) 26,369. (2.) Town, Middlesex co., Massachusetts, U.S.A., 10 m. N.W. of Boston, famous as the scene of the first contest in the revolutionary war (April 19, 1775). The chief industries are farming, dairying, and the manufacture of leather binding. Pop. (1900) 3,831.

Lex Locī. Many transactions are governed by the law of the place, and not by the law of the domicile of the parties. But the place may be determined in several ways: for example—(1) *Lex loci rei sitæ*, the law of the place where the thing is situated—e.g. land is always governed by the law of its situation; (2) *Lex loci contractus* or *celebrationis*, the law of the place where the contract is made; (3) *Lex loci solutionis*, the law of the place where the contract is to be performed.

Leycesteria, a genus of hardy, deciduous shrubs, order Caprifoliaceæ, natives of the Himalayas. The genus contains but one species, *L. formosa*, a handsome, rambling plant, bearing drooping racemes of sessile white flowers in June and July.

Leyden, or LEIDEN (anc. *Lugdunum Batavorum*), tn., Netherlands, prov. S. Holland, on the Old Rhine, 9 m. N.E. of the Hague, the seat of a famous university, founded in 1575, and attended by about 900 students. Amongst its better known teachers have been Arminius and Gomarus, Grotius, Descartes, Scaliger, Salmasius, Ruhnken, Hemsterhuis, and Boerhaave. The medical faculty has been and still is especially distinguished. The painters Rembrandt, Lucas van Leyden, Jan Steen, Gerard Douw, and Van Mieris were all natives of Leyden, as well as the Anabaptist leader, Jan Bockold, or John of Leyden, and some of the Elzevirs, the printers. In the 14th century the town was famous for its cloth and baize. These are still made, as are also woollens, cottons, leather, soap, and salt. In 1573-74 the town heroically resisted the Spaniards. Pop. (1899) 53,657.

Leyden, John (1775-1811), Scottish poet and Orientalist, born at Denholm, Roxburghshire, where his father was a shepherd. He was educated at Edinburgh University, where his career was brilliant. Classics and modern languages were his chief study. He is said to have been master of at least a score of languages and as many dialects. Destined as a preacher, Leyden was licensed in 1798. But failingsadly in his pulpit appearances, he drifted into literature, and became a constant contributor to the journals of his time. With Scott he was on terms of closest intimacy, and in the preparation of the *Minstrelsy* there was no more valued helper. Leyden was a born balladist, and several of his compositions adorn the volume. He graduated M.D. of St. Andrews (1803) after six months of 'incessant day and night study.' Sailing for India, he occupied during the next seven or eight years a number of important governmental positions, and died at Java at the early age of thirty-six. His chief poem, *Scenes of Infancy* (1803), is a universal favourite in Teviotdale. His best piece is probably the *Address to an Indian Gold Coin*. See *Memoirs* by Scott Morton (1819) and Robert White (1858), Crockett's *The Scott Country* (1902), and the recently discovered *Tour in the Highlands* (1903), which contains an admirable bibliography of his life and writings.

Leydenburg. See LYDENBURG.

Leyden Jar, a particular form of electrical condenser, named from the place where the principle of its construction was discovered. See ELECTROSTATICS and CONDENSER.

Leyds, Willem Johannes (1859), minister-plenipotentiary of the late South African Republic (1898-1900), the chief adviser of Mr. Kruger after the Jameson raid. Appointed attorney-general (1884), he held that post until he was elected state secretary (1888), and re-elected (1893 and 1897). He resigned the office (1898) to become plenipotentiary in Europe; but since the annexation of the republic he has disappeared from public life. He was always credited with violent anti-English opinions.

Leyland Steamship Line. This steamship line was founded by F. R. Leyland, after whose death in 1892 it was converted into a company, being re-formed in 1900 with a capital of £2,800,000. The company owned the Leyland line of steamships, consisting of a fleet of forty-two vessels, with an aggregate tonnage of 237,188 tons, and carrying passengers and goods between Liverpool and the

Continent, the United States, Canada, W. Indies, Mexico, and other countries. In 1901 a large interest in the company was acquired by American financiers.

Leys, HENDRIK, BARON (1815-69), Belgian historical and genre painter, was born at Antwerp. He made the 'resuscitation of a national art' his aim, and painted the illustrations of Flemish history in the Hôtel de Ville, Antwerp. His works gave him a European reputation. *The Armourer* is at Windsor, and *The Knight's Funeral* in the South Kensington Museum. See Sulzberger's *Henri Leys* (1885).

Leyssera, a genus of S. African evergreen, herbaceous plants, order Compositae. *L. gnaphaloides*, with orange flower-heads, and *L. capillifolia*, yellow, are the best-known species.

Leyte, isl., Visayas group, Philippines, s.e. of Luzon. Area, 3,872 sq. m. On each side of the island is a large bay, with several excellent harbours. The interior is mountainous; highest peak, Mount Sacripante (3,930 ft.). The island is fertile and well watered, and there are extensive forests of dammar pine and fine hard wood. The principal crops are hemp, rice, sugar, coffee, cotton, and corn. Minerals are abundant. The chief manufactures are coconut oil and hempen goods. Shipbuilding is carried on at the capital, Tacloban. Pop. (1902) 270,490.

Leyton, par. and tn., Walthamstow div., Essex, England, on Lea R., 8 m. w. of Romford, is a N.E. suburb of London; has Roman remains. Pop. (1900) 98,900.

Leze-majesty (cf. mod. Fr. *lèse*, 'to injure'), an insult to, or an offence committed against, the person of the sovereign, punishable by death. It comes under the law of treason, of which the essential features are traceable to an act of Edward III. Abroad leze-majesty includes many less serious offences than those dealt with by this act.

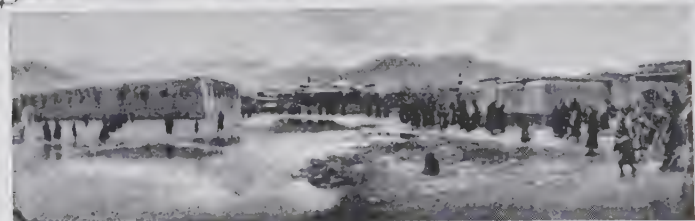
Lhasa, LASSA, HLAASA, or LOSA ('Abode of the Divinity', 'of the Divine Intelligence', 'of the Venerable One'), cap. of Tibet, metropolis of Lamaite Buddhism, seat of the 'Dalai Lama' ('Sea of Wisdom'), chief tn. of U or Ui prov., 500 m. N.N.E. of Calcutta, 25 m. from the junction of the Ki-chu with the Upper Brahmaputra (Sanpo), over 11,800 ft. above sea-level, in 29° 39' 20" N. lat., and 91° 5' 46" E. long.; population fluctuating, but considered by the best recent travellers as not much exceeding 10,000 in the city itself (not including pilgrims and other visitors making temporary sojourn). Of this 10,000, Tsybikov estimates two-thirds to

be women. The town circuit measures from four and a half to five miles; that of the area enclosed by the circular road which pilgrims traverse (praying all the while) is from seven and a half to eight miles. Lhasa is well built for an Asiatic town; the main streets are wide and regular, lined with trees, and containing many large stone, brick, or earthen houses, several stories high, terraced at the top, and painted white, except the windows and door-frames, which are red and yellow, the sacred colours. In one quarter the houses are largely built of ram's-horns and ox-horns, forming extraordinary patterns. The chief edifices of Lhasa are sacred. Among the leading monasteries are those of Miru or Muru, on the N., a centre of literary Lamaism, with a printing press; Daibun or Daibung, seven miles N.W. of central Lhasa, and the largest monastery of the sacred town (8,000 to 8,500 monks); Sera, three miles to the N., renowned for its ascetic hermits, as Daibun is for its seers, or the more distant Galdan (twenty miles to the S.E.) for its relics. Daibun, Sera, and Galdan were all founded by the Buddhist reformer Tsonhava, or during his lifetime, at the beginning of the 16th century. They are now not so much refuges of eremites as schools for teaching philosophical theology. The cathedral, Jowo-khang, the true Lhasa, or 'place of the gods,' standing in the south-central portion of the town, not far from the circular pilgrim road, and Potala, the palace of the Dalai Lama, w. of the city proper, are the chief sites of Lhasa. The present residence of the Buddhist pope, a towering building of four stories, on the summit of the 'Haven hill' which rises abruptly out of the plain in which Lhasa stands, and terminating in five gilded domes, was an offering from Kanghi, first Manchu emperor of China, replacing a building destroyed by the Dungans at the beginning of the 18th century; but from the 7th century A.D. the Potala mount has been one of the holiest places of the Buddhist world. Its treasury contains a famous collection of sacred objects both old and new. To the S.W. of Potala is the summer residence of the Grand Lama, the medical college of Chagpa hill, the palace of the ex-regent Kun-de Ling, and the Lama's Shukri throne-garden; to the N.W. are the palaces of the Grand Lama's parents; to the E. is the main body of the city; to the S.E. the Chinese residency, theatre, barracks, and vegetable gardens, and the Lama's Tse-drung pleasure park. Among

other notable objects of the city are the palaces of the present and late king and prime minister, N.W. of the cathedral; the temple of the Buddha of Boundless Life, the upper and lower schools of mysticism, and the residence of the astrologer-royal, to the N. and N.E.; the Kashmiri mosque, to the S.E.; the leather, horse, and mule markets, along the eastern section of the circular road; the royal pasturage and dancing-grounds, to the W., between Potala and the city; and the irrigation canals, to the S.

The principal industry of Lhasa is woollen manufacture, but silk stuffs, tea, and other Chinese products are here exchanged for Indian, European, Russian, and other wares. Musk, yak tails, sable furs, dried fruits, sugar, rice, tobacco, indigo, hardware, drugs, sweetmeats, velvet, linen, incense, articles of Buddhist worship, gems, and shawls, are also among the articles of local trade (import or export). The chief merchants and bankers are Moslems, originally from Kashmir, but now settled for centuries in Lhasa, and called Kachis. The trade in linen, silk, cloth, most articles of luxury and of dress, is also in their hands. The metal-working and colouring industries are controlled by the Indian (Bhutanes or Nepalese) Pebuns; the Chinese colony is mostly composed of government officials, soldiers, and religious students. From December, when the foreign merchants arrive, to March, when they leave, is the busy time in Lhasa. Most of the petty shopkeepers are women, who trade at booths in the open air, and do not veil but stain their faces.

Lhasa was perhaps visited by the Franciscan traveller Odoric of Pordenone in about 1328, on his way home from China to Europe; if so, he was the first European to see it. In the 17th and 18th centuries several Jesuit and Capuchin missionaries (Andrada, 1624; Grueber and Dorrville, 1661; Desideri, 1716-29; Della Penna, 1719-41) penetrated here, as well as the Dutch layman Van de Putte (1724). After 1760 access was forbidden to Europeans; but a few have eluded the restriction since, such as Manning in 1811 and Huc and Gabet in 1844. The prohibition does not apply to Russian Buriats and Kalmuks, several of whom have visited the city—e.g. Tsybikov in 1900-1901, Norzunov in 1899-1900, Badmaiev in 1900. Several Indian-pundits have also gone there (in 1866, 1872, 1875, 1879, 1880), and made important observations. On August 3, 1904, a military expedition from British India arrived at Lhasa, and on September 7 a treaty was signed



Views in Lhasa.

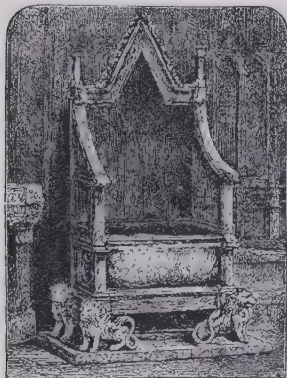
1. A Street in Lhasa. 2. The Potala. 3. The British Expedition in Lhasa. 4. Scene in Lhasa. 5. The 'Chortan' at the entrance to Lhasa, with the Potala. (Nos. 1 and 2 by permission, from photographs by the Imperial Russian Geographical Society. Nos. 3 and 4 by the British Tibet Mission, supplied by the Topical Press Agency. No. 5 by permission of Messrs. Hoffmann, Calcutta.)

in the Potala palace, by which trade facilities with British India were increased, and the exclusive attitude of the Tibetan government was somewhat modified. Buddhism was not firmly established in Tibet until the 4th century A.D., and the importance of Lhasa as the Rome of this religion was largely the result of the ruin of the faith in Hindostan between the 6th and 11th centuries. See Sarat Chandra Das's *Journey to Lhasa* (new ed. 1904), and Waddell's *Lhasa and its Mysteries, with a Record of the Expedition of 1903-4* (1905).

Lherzolite, a dark green or black crystalline rock which consists of olivine, enstatite, and augite (chrome diopside). It is a member of the peridotite group, and has long been known to occur at Lherz in the Pyrenees.

L'Hôpital, Michel de (1507-73), chancellor of France (1560-8), who tried to carry out a liberal-minded policy during the regency of Catherine de' Medici for her son Charles IX. He staved off the Inquisition, opposed persecution, and held the balance between Roman Catholics and Huguenots in the civil wars. But having lost the friendship of Catherine after the peace of Amboise (1563), he resigned his chancellorship, and retired to Etampes. He expressed his horror of the massacre of St. Bartholomew in a Latin poem. See *Lives* by Villemain (1827), Taillandier (1861), and Dupré-Lasale (1875).

Li, a Chinese measure of distance, equal to rather over one-third of an English mile. Post-houses are generally to be found about ten *li* apart.



The Coronation Chair, with the 'Stone of Destiny.'

Lia Fail, the *Fatale Marmor*, or 'Stone of Destiny,' on which the ancient Irish kings sat at their coronation, and which was said traditionally to utter a groan if the person who occupied the

seat was a pretender. It was removed by Fergus, the first Scottish king (513), from Ireland to Dunstaffnage; by Kenneth II. to Scone (840); and by Edward I. to London (1296). It now forms a part of the coronation chair in Westminster Abbey.

Liana, a name given to the woody, climbing, and creeping plants of tropical forests. Among them are species of *Smilax*, *Wrightia*, and *Calamus*.

Liao-tung. See FENG-TIEN.

Lias. The Lias comprises the lowest part of the Jurassic system, and consists principally of dark gray clays with an intercalated, more calcareous series which is known as the Middle Lias or Marlstone. It rests conformably on the Rhetic beds, and passes upwards into the Inferior Oolites. Many species of fossils are found in this group of rocks, including ammonites, belemnites, marine bivalves, and great reptiles (Ichthyosaurus, etc.). The Lias stretches across England from the coasts of Devon and Dorset to that of Yorkshire, forming a tract of flat-fish country, in which the harder bands of limestone stand up as minor escarpments.

Liatis, a genus of N. American perennial plants, order Composite, sometimes known as 'blazing stars' or 'button snake roots.' The flowers are usually purple or white, and the leaves narrow and entire. Many are desirable garden border plants, thriving in ordinary garden soil. Among the species is *L. scariosa* (or 'rattlesnake's master'), a decoction of the bulbs being used in N. America to cure the bite of the rattlesnake.

Libanion (c. 314 to after 391 A.D.), Greek rhetorician, was a native of Antioch, but lived chiefly at Athens, Constantinople, and Nicomedia, though he returned to Antioch for the latter part of his life. Several of his works survive, the most important of them being sixty-seven speeches and more than a thousand letters, which are elegant in style and historically important. Editions: of the speeches, Reiske (1791-7); of the letters, J. Ch. Wolf (1738). See Sievers's *Das Leben des Libanion* (1868).

Libanon. See LEBANON.

Libation, an offering of wine or other liquor made to the gods of Greece and Rome. It was the custom whenever wine was drunk first to pour a drop into the cups and then to pour it out on the ground in honour of the gods; and on special occasions whole cups were emptied, sometimes over victims sacrificed. A libation in ancient Greece was the chief ceremony in concluding a peace—the literal translation of the Greek word for a treaty of peace being 'libations.'

Libau, LIBAŲA, or LIEPAJA, tn., port, and important Baltic naval station, Courland gov., N.W. Russia, in Grobin dist., 7 m. W.S.W. of Grobin town, and on a tongue of land between the sea and the lagoons known as Libava Lake. It is the centre of several great railways from the imperial capital and from the interior, and has good stone buildings, public gardens, and promenades. The port (on the lake) is almost ice free, being open three weeks before that of Riga, and six weeks before that of St. Petersburg. It is the most southerly Russian harbour of note on the Baltic, and is of increasingly commercial importance. The lake is connected with the open sea by a canal (over 23 ft. deep) which gives access to the largest ships, and is kept open throughout the winter by ice-breakers. Chief exports—grain, flax, hemp, linseed, petroleum, fish and salt meat, wool, leather, and skins. There are manufactures of rope, matches, agricultural implements, furniture, amber, and soap. There are naval dockyards, and a large meat-freezing establishment. It was acquired by Russia in 1795. Pop. (1897) 64,505, one-fourth being Jews. Libau suffered severely in the Russian disturbances of 1905-6.

Libavius, ANDREAS (1560-1616), German chemist, born near Halle; was primarily a physician, but devoted his attention largely to chemistry, and became director of the gymnasium at Coburg (1605). He published, under the title of *Alchymia* (1597), a treatise dealing with the chemical facts and theories of the time, and in opposition to the views of Paracelsus.

Libel. See DEFAMATION.

Libellatici, a name given to those who fell away from Christianity, particularly during the persecution of the Emperor Decius (249-252 A.D.).

Libellula, a genus of dragonflies, to which belong about nine British species. An example is *L. depressa*. See DRAGON-FLY.

Liber, a name frequently given by Latin poets to the Greek god Dionysus; but the god Liber and the goddess Libera were ancient Italian deities, who protected the vine and gave fertility to the fields—hence they were worshipped along with Ceres.

Liberalism, a term used in politics and in ecclesiastical controversy, and subject, therefore, to some ambiguity when it is used in both ways.

The term seems to have been first used in Spain, to indicate the advocates of freedom in church and state along what may be called constitutional lines. Liberalism was anti-clericalism, as

the corresponding movement in France and Italy, however named, has generally been. But liberalism has always claimed the merit of working on constitutional lines, or of working to secure a constitution as a guarantee of freedom.

Under one name or another, liberalism appears in the politics of every modern state. Owing to changes of circumstances and conditions, the party which bears the name Liberal may be very far from having any present right to the name; and it is not always safe, in dealing with the domestic politics of foreign nations, for a Briton to assume that the Liberal party in another land stands for the same or similar ideas as the Liberal party stands for in England. Much depends on what has already been achieved. The most advanced party in German politics—*viz.* the Socialists—puts forward a programme which, in so far as it is not economic in character, calls for reforms which were secured in England nearly half a century ago; while the German Liberals, who are relatively weak, correspond to the earlier English Whigs. Liberal parties in England and Germany have frequently been weakened by secessions and disruptions. After such an event each section claims the right to use the name.

But though there is in every modern state some body advocating liberal ideas of reform and freedom, the name is prominent in the politics of three nations only which need special reference—Germany, Canada, and England.

The German Liberal party or parties may be said to date from the revolution of 1848, when the more moderate advocates of reform separated themselves from the Radical section of the reformers. Early Liberalism was succeeded by the Nationalism of the middle of the 19th century; and out of the somewhat vague Liberal or Progressive party was formed, in 1866, the National Liberal party, which professed to seek freedom in a national unity. The party was weakened by the Free Trade controversy, which in 1880 resulted in the secession of the free traders to form one of the minor groups in German politics. Since then the National Liberals have declined in importance as a party.

In Canada the Liberal party was formed out of somewhat heterogeneous elements. Those who favoured and carried confederation naturally supported the first administration, while the opponents of that union who had secured seats in the new Dominion Parliament were in opposition. These opponents had been drawn partly from the old

reformers, and partly from the old Conservative parties. The Liberal party began to take definite shape about 1872, and in 1874 accepted office. In 1878 they were defeated in the country on the Protectionist issue, and till 1896 remained, under various leaders, in opposition. In 1896 they, as a Free Trade party, carried the election, and have since maintained themselves in power.

Liberalism in England dates from the period of the Reform Act, when, owing to the extension of the suffrage, the power of the Whig houses began to decline. The Liberal party has been the reform party in English politics; but it has been, as all reform parties have been, composed of divergent and contending sections. On the one hand was the Whig element, believing strongly in freedom as already achieved, and accepting the doctrine of *laissez-faire*. The work which the Liberal party has accomplished has been mainly of a political character. It has been concerned mainly with the perfecting of the political machine, so to speak. The extension of the franchise may be taken as the typical example. This was promoted, not as a good in itself, but as providing an opportunity to a hitherto unrepresented class to express their demands. Social legislation from the Liberal point of view must come only as the result of demand; it cannot be imposed on the people from above. This, in a measure, is what has happened. The country refused to accept the last Liberal reform of the political mechanism—*viz.* Home Rule—because that measure was so much more than a readjustment of machinery; and Home Rule having been relegated more or less to the background, the party fell back for a time on the particularism of the Newcastle programme.

The motto of the Liberal party in the middle of the 19th century—'Peace, Retrenchment, and Reform'—indicates both the strength and the weakness of the party. It pursued an essentially domestic policy. Not only was it opposed to a spirited foreign policy, but frequently it spoke and acted as if a foreign policy were unnecessary. Liberal administrations have been by no means always successful in avoiding foreign complications, although it has to be remembered that an administration is to a large extent bound to carry on the work of its predecessor and to meet its obligations. On one point only has the Liberal party departed from its devotion to a domestic and non-interference policy—and that is in relation to nationalism. Through its

great leader, Mr. Gladstone, it has always shown a great regard for the principle of nationality, and has repeatedly intervened to secure the recognition and salvation of oppressed nationalities—*e.g.* in Italy and in the Balkans.

Liberal League, a political organization founded in 1902 within the English Liberal party, but claiming for itself great liberty of speech and action. It was formed to promote the ideas set forth by Lord Rosebery in a speech at Chesterfield (Dec. 1901), in which he called for efficiency and for a 'clean slate,' particularly as regards Home Rule. The League adopted this as a programme; but it is not in any sense a rival to the official organization of the party.

Liberal Unionists. See POLITICAL PARTIES.

Liberia, independent negro republic on Grain Coast of W. Africa, between Sierra Leone on the W. and the French Ivory Coast on the E., extends for 500 m. between the Manna and the Kavalli, from the basins of which conventional boundaries were determined by the Anglo-Liberian and Franco-Liberian agreements of 1885 and 1892, fixing the limits of the hinterland as far as the gathering ground of the Upper Niger and its tributaries, an inland stretch of some 200 m. The total area has been estimated at 45,000 sq. m. The coast is deeply indented, and has numerous lofty headlands. Beyond the narrow coast region the country rises in successive terraces towards the highlands near the hinterland, where there are valuable but neglected forests of gum trees, oil palms, and other trees. The country is said to be rich in minerals (gold, coal, and diamonds), which the W. African Gold Concessions Company began to exploit in 1901. Exports are coffee, rubber, palm oil and kernels, cocoa, and raffia fibre. The revenue, mainly derived from customs duties, was in 1903 £70,000; the expenditure £68,000. The chief towns are Robertsport, Monrovia (cap.), Marshall, Edina, Great Bassa (Upper Buchanan), Greenville, and Harper. The capital has a population of 5,000; while the population of the country is estimated at 2,000,000 natives (Krumen being the most important), pagans and Mohammedans, and some 60,000 civilized negroes, who are Episcopalians and Presbyterians, etc. English is the official language, and British weights and measures and money are largely used. The president, vice-president, and a council of six form the executive, while legislation is in the hands of the House of Representatives and the Senate. Liberia was sug-

gested in 1816 as a home for freed American negroes, but it was not till 1822 that an actual settlement was made. In 1847 the colony was recognized by the powers as an independent republic. Intertribal wars have been frequent, but the declaration of peace signed in 1904 by the most powerful chiefs may lead to their cessation. See Woorverman's *Liberia* (1885); Dutry's *Liberia, son Histoire, sa Constitution et ses Ressources* (1887); Buttikofer's *Reisebilder aus Liberia* (1890); and Durham's *The Lone Star of Liberia* (1893).

Liberius, Sr. (352-366), pope, who, for supporting the Nicene Creed and its champion, St. Athanasius, patriarch of Egypt, was banished to Thrace (355). He was restored to his see (358), but the terms of his recall are much disputed. Some of his letters are preserved by Constant in the *Epistole Romanorum Pontificum* (1821). See Döllinger's *Papst-babeln* (1890).

Libertad. (1.) Roadstead on the Pacific coast of Salvador, Central America, which serves as a port for the capital, San Salvador. (2.) Maritime dep. in N.W. Peru, S. America, lying between the Pacific on the w. and the dep. Loreto on the e., and between the deps. Lambayeque, Cajamarca, and Amazonas on the N. and Ancachs on the s. Area, about 10,000 sq. m. The capital is Truxillo. Mahogany, dyewoods, sarsaparilla, hides, cattle, fruits, and cocoa are exported. Pop. 251,000.

Liberté, a first-class French battleship, launched 1905, displacement 14,868 tons.

Libertia, a genus of plants, mostly natives of New Zealand or Australia, family Iridaceae. They bear white or blue flowers in loosely corymbose panicles, and have crowded linear, radicle leaves. Among the species are *L. paniculata*, *L. grandiflora*, and *L. formosa*.

Liberties, THE, dist. in the s.w. of Dublin, Ireland, so called from the supposed privileges granted to its inhabitants.

Liberty, Equality, Fraternity (Fr. *liberté, égalité, fraternité*), the motto of the French republic adopted at the time of the first revolution. By 'equality' was meant not equality of position, but equality for rich and poor in the eyes of the law.

Liberty of the Press. See PRESS, FREEDOM OF THE.

Librum Veto. This was the power which any *nuntius* had of bringing the proceedings of the Polish Diet to a close by uttering the word *Niepozwalam* ('I forbid'). The first occasion on which this was done was in 1651, when Siciński, a deputy from Upita in

Lithuania, pronounced the fatal syllables. The germ of this custom can be traced back as far as the time of Alexander, king of Poland (1501-6). Unanimity of vote was a great feature of Slavonic assemblies. It was characteristic of the Russian *sobori* and the meeting of the *veche* at Novgorod.

Libitina, an ancient Italian deity, goddess of the earth and its delights, especially gardens. She also presided over funeral rites and burial.

Libmanan, tn., Camarines prov., Luzon, Philippines, 11 m. N.W. of Nueva Caceres. Pop. (1898) 14,512.

Libocedrus, a genus of evergreen coniferous trees, bearing oval, obtuse, woody cones. The hardest species is *L. tetragona*,

principal manufactures are liquors, sugar, and woollen goods. There are vineyards in the vicinity. Pop. (1901) 19,175.

Libra, an ancient constellation, and the seventh sign of the zodiac, characterized by the symbol ♎ . The Greeks called it Chelæ, the 'Claws' (of the Scorpion); the Romans, Jugum, the 'Yoke,' or Libra, the latter title finally prevailing through its adoption in the Julian calendar. The sign is entered by the sun about September 23; the constellation, not until October 29. Its leading star, called Kiffa Australis, the southern 'Tray' of the Scale, is of Sirian type and widely double, α_2 being of 2.7, α_1 of 5.4 magnitude. Kiffa Borealis, or β Libræ, is a greenish helium star of 2.7



Liberia.

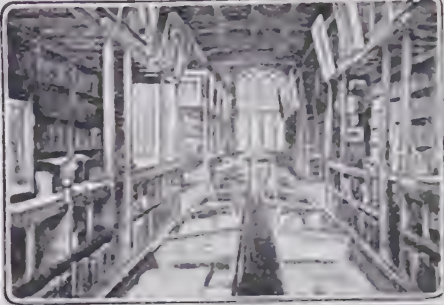
from Patagonia, pyramidal in habit, the spreading branches having a downward sweep. Other species are *L. chilensis*, with yellow, very fragrant wood; *L. decurrens*, a Californian tree, with columnar form; and *L. doniana* (the kawa of New Zealand).

Libonia, a genus of tropical plants, order Acanthaceae. The best known species is *L. floribunda*, a native of Brazil, which bears numerous drooping, scarlet, tubular flowers, and has a most graceful habit. This, and a hybrid derived from it, *L. penrhosensis*, are worth greenhouse cultivation.

Libourne, tn. and riv. port, cap. of Gironde dep., France, on the r. bk. of the Dordogne, 17 m. N.E. of Bordeaux. It was one of the ancient free towns founded by the English in 1269. The prin-

magnitude. Due south of it lies the globular cluster Messier 5, known to contain 85 short-period variables. The variability from 5.0 to 6.2 magnitude of δ Libræ is due to eclipses by a dark companion revolving in 2 days 8 hours.

Libraries. The noblest library of ancient times was that of Alexandria, founded by Ptolemy Soter. More than once it was plundered or partially injured by fire, and was at last utterly destroyed by the Saracens under the Caliph Omar (642). Next to the Alexandrian library, that of Pergamos was the most conspicuous, and, according to Plutarch, contained 200,000 volumes. This library was presented by Mark Antony to Cleopatra as the nucleus for a new library at Alexandria. Another great



Famous British Libraries.

1. Advocates' Library, Edinburgh: upper corridor. (Photo by J. Patrick.) 2. Bodleian Library, Oxford. (Photo by G. W. Wilson & Co.) 3. British Museum Library: the Reading Room. (Photo by D. Macbeth.) 4. Trinity College Library, Dublin. (Photo by W. Lawrence.) 5. Cambridge University Library. (Photo by J. Palmer Clarke.)

library was that of Constantine the Great at Byzantium, which eventually numbered 120,000 volumes.

Between the fall of the Roman empire and the revival of letters, about the middle of the 15th century, we hear little of libraries. In mediæval times the possession of libraries was mainly confined to the religious orders. The library of Monte Cassino may be taken as the best of the monastic libraries, still containing 800 volumes of mss. of the 11th and 12th centuries. The invention of printing in the 15th century did more for libraries and the perpetuation of the literary treasures of antiquity than could ever have been possible otherwise. At this time were founded the imperial libraries of Paris and Vienna, the Laurentian library at Florence, that of Frederic, duke of Urbino, that of Corvinus, king of Hungary, and the library of the Vatican; and at this period lived the patron-saint of British book-lovers, Richard Aungerville, bishop of Durham, who is the first recorded donor of books to the University of Oxford.

In Queen Elizabeth's time, the golden age of English literature, Sir Humphrey Gilbert vainly pressed upon the notice of the queen the superior advantages which men of letters enjoyed in other countries, and the necessity of a royal library upon an adequate scale. But the fulfilment of the enterprise was at last due to the efforts of private individuals, chief among them Clement Littill, who laid the foundation stone of the library of Edinburgh University in 1580, and Sir Robert Cotton, the collector of the Cottonian manuscripts now in the British Museum.

Our great national library is an aggregation of collections obtained from time to time, and continually added to. It owes its immediate origin to the bequest of Sir Hans Sloane, whose collections were purchased by government for public use. The library has since been enriched by various additions, and by works received in terms of the Copyright Act (5 and 6 Vict. c. 45)—a privilege shared in by the Bodleian at Oxford, Cambridge University, Trinity College, Dublin, and the Advocates' Library, Edinburgh—until it has become one of the finest in the world. See BRITISH MUSEUM.

Another of the great libraries of the world is the Bibliothèque Nationale in Paris, containing nearly three million volumes. It is chiefly from the revolution that its progress as a modern library begins to acquire interest in comparison with other great

libraries, notable improvements having been made in 1832 by Guizot, the historian.

A third great European library is the Imperial Library of St. Petersburg, containing 1,330,000 volumes. Peter the Great laid the foundation of the collection in 1714 by annexing the books he found in his invasion of Courland, and in 1795 the great Zaluski Library was added to it.

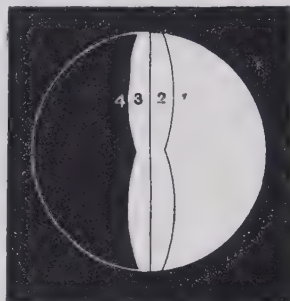
The principal libraries in America are the Library of Congress at Washington, now containing over a million volumes, to which every publisher has to contribute two copies of each book which he issues; the Public Library of New York (the Astor, Lenox, and Tilden foundations) with its branch libraries, containing 1,837,000 volumes; and the Public Library of Boston, with 1,485,000 volumes. The last, to Europeans, is perhaps the best known and most interesting of American libraries, as it contains one of the finest Shakespeare collections in the world, formed by its donor, Mr. T. P. Barton.

Some of the former great private libraries in England are worthy of mention, the principal being the collections of John Evelyn, the Duke of Roxburghe, William Roscoe, William Beckford, Richard Heber, Sir Mark Sykes, Lord Ellesmere (at Bridgewater House), the Duke of Devonshire (at Chatsworth), Lord Spencer (at Althorp), the Earl of Sunderland, Henry Perkins, Sir Thomas Philipps, and Lord Ashburnham, most of which have been dispersed; and many other more modern collections, such as the Huth Library at Rutland Gate, the Christy Miller Library at Britwell, the Locker-Lampson library at Rowfant, and Lord Acton's library, bought by Mr. Andrew Carnegie and presented to Mr. John Morley, who in turn presented it to Cambridge University.

In recent years the special feature of the British library system has been the work done under the Public Libraries Act. See PUBLIC LIBRARIES ACT.

In 1877 a Library Association was founded, now numbering over six hundred members, consisting of librarians and others who take an interest in library work, cataloguing, bibliography, etc. See Edwards's *Memoirs of Libraries* (1859), *Libraries and Founders of Libraries* (1865), and *Free Town Libraries* (1869); Greenwood's *Free Public Libraries* (1890); Ogle's *The Free Library* (1897); Burgoyne's *Library Construction* (2nd ed. 1905); Macfarlane's *Library Administration* (1898); and *Transactions and Proceedings of the Library Association*.

Librations, apparent oscillations of the lunar globe by which otherwise invisible sections of it are brought into view. They are of three kinds. (1.) Libration in latitude is an alternate dipping towards the earth of the moon's north and south poles by an angle of $6\frac{1}{2}^\circ$. It is due to the inclination of her axis to the plane of her orbit. (2.) Libration in longitude. If the moon's orbit were circular, the same hemisphere would always be presented to the earth; but the eccentricity of her path causing her motion to vary, we see portions of her averted face, now on the eastern, now on the western side, to a maximum extent of $7^\circ 45'$. (3.) Diurnal libration is an effect of our own shift of position between morning and evening. We look over the western edge of the rising moon and over the eastern edge of the setting moon by just 1° , which is the value of the



The Moon's Librations.

1, Part always seen; 2, part carried out of view by libration; 3, part brought into view by libration; 4, part never seen.

moon's parallax, or the angle subtended at the moon's distance by the semi-diameter of the earth. As the result of these various inequalities, nearly six-tenths of the lunar surface come under observation. The planet Mercury also exhibits librational effects.

Libretto (Ital. for 'little book'), a name now generally applied to the words or story of a musical drama. The librettos of many operas are founded upon subjects taken from the works of Shakespeare, Scott, Goethe, Goldsmith, and others; but whether adaptations or original productions, operatic librettos are proverbially weak. Wagner discarded a number of these forms, and made much use of the *leit-motiv* in his operas; while to give the fullest expression to his new ideas, he—after *The Flying Dutchman*—wrote all his own librettos. The most noted Italian librettists have been Metastasio, Calzabigi, and Felice Romano; French—the Abbé Perrin, Quinault, Scribe (perhaps the great-

est), Barbier, Meilhac, and Halévy; German—Geibel, Goethe, Wieland, and Schikaneder; English—John Gay, Alfred Bunn, Edward Fitzball, Planché, and Gilbert.

Libreville, tn., cap. of French Congo, W. Africa, at mouth of river Gabun, is an important seaport and coaling station. Pop. (natives) 5,000, and some 200 Europeans.

Libri-Carrucci, GUGLIELMO BRUTUS ICILIUS TIMOLEON, COUNT (1803-69), Italian mathematician and bibliophile, born at Florence; became mathematical professor at the Sorbonne, Paris, member of the Institute, and director of state libraries. He was charged with appropriating MSS. from the Bibliothèque Mazarin, and sentenced (1850), while living in England, to ten years' imprisonment. Some of the MSS. were recovered and brought back by the French government in 1838. Libri-Carrucci was the author of *Histoire des Sciences Mathématiques en Italie* (1838-41).

Liburnia, dist. of Illyricum, along the coast of the Adriatic, forms part of the modern Croatia.

Libya, ancient geographical name for the continent of Africa. In Roman times the term was specifically applied to the region now known as the Libyan Desert.

Libyan Desert, region N. Africa, including parts of Egypt, Tripoli, and Barca, and lying to the W. of the Nile. It is an immense stony plateau, rising from 600 to 1,000 ft. above the Nile level in gentle terraces. A series of deep depressions contains the famous oases Khargeh, Dakhel, Farafrah, Bahariyah, and Siwah. Numerous springs occur in these districts, and give rise to their great fertility. Westward the desert merges into the unexplored wastes of the Sahara.

Licata, or **ALICATA**, sept. tn., prov. Girgenti, Sicily, at mouth of river Salso, 24 m. S.E. of Girgenti, has ruins of two ancient castles. The principal export is sulphur. The harbour was improved in 1896, and is one of the best in Sicily. Pop. (1901) 22,031.

Lice are small insects belonging to the family Pediculidae, of the order Hemiptera. The integument is very thin, wings are entirely absent, the thoracic segments are indistinctly separated, and the feet end in a single long claw. The head bears a short tube furnished with hooks, and from this a suctorial tube can be protruded, by means of which the insects suck the blood upon which they feed. They are parasitic on the bodies of mammalia, clinging to the hairs by the hooked feet, and are apparently very prolific. Some forty species, belonging to six genera, are known.

Licence and the Licensing Laws. A licence is an authorization to do some act which would otherwise be an infringement of the rights of another—e.g. a licence to cross another man's land. This is not an easement, and gives no right of property, but a mere personal authority which may be revoked at any time upon reasonable notice. Even an exclusive licence—e.g. the sole right of letting boats for hire upon a lake—creates no right of property which could be maintained against third parties; but, of course, if it is granted for valuable consideration and is infringed, the grantor of the licence will be liable to an action for damages.

Many things cannot be legally done without a licence from the proper authority. For example, a corporation cannot hold land in England without a licence from the crown, called a licence in mortmain; a clergyman of the Church of England cannot hold a benefice without a licence from the bishop of the diocese. For fiscal purposes excise licences are required in a great many cases. Apart from the sale of intoxicating liquors, more fully dealt with below, licences are required by appraisers, auctioneers, house agents, hawkers, pawnbrokers, dealers in plate, makers and vendors of playing cards and patent medicines, dealers in and retailers of tobacco; also for keeping dogs, horses, carriages, light locomotives, and men servants; to carry a gun, to kill game, and to use armorial bearings. Dealers in game require both an excise licence and a licence from the justices, who hold special sessions in July for the purpose of granting them.

What are commonly called the Licensing Laws are the acts regulating the sale of intoxicating liquors. It is not possible to do more here than refer to the main provisions of the acts.

No intoxicating liquors can be sold without an excise licence. Wholesale dealers require only an excise licence. Retailers require both an excise licence and a certificate or licence from the justices, and the former will not be granted except on production of the latter. An exception is made in the case of retail licences for consumption off the premises, taken out by wholesale wine and spirit dealers.

The excise licences granted to retailers differ according to the drink to be sold, the kind of business carried on by the vendor, and the place where the drink is to be consumed—i.e. *on* or *off* the licensed premises. An *on* licence authorizes consumption either *on* or *off*.

In counties the licensing authorities are the justices of each petty sessional division. They hold special sessions annually, within the first fourteen days of February, called the General Annual Licensing Meeting, and an adjournment of the meeting within one month. In boroughs, if there are less than ten justices, they are the licensing authority acting as a body; if there are more than ten justices, they appoint a committee of not less than three or more than seven, or in country boroughs of whatever number they may determine, not being less than seven. (Act of 1904.)

The licensing authorities hear applications for new licences, and may refuse them in their absolute discretion, and without appeal. If they think fit they may grant new licences, provided the applicant is a fit person and the premises are structurally adapted for the intended business, and of a certain annual value.

New licences require confirmation; and persons who have objected to the grant of a new licence, and they only, may object to its confirmation. The confirming authority is, in counties, the committee appointed by the justices in quarter sessions, in accordance with rules approved by a secretary of state; in boroughs, if there are more than ten justices, the whole body of the justices, and if there are less than ten, a joint committee of county and borough justices.

Renewals.—In the case of annual licences, applications for renewal must be made to the licensing authority every year. If they decide to renew, there is no appeal by objectors. As to refusals to renew, the following provisions apply:—In the case of *off* licences, persons who hold such licences for wines, spirits, liqueurs, sweets, or cider, on June 25, 1902, cannot be refused except on grounds connected with the character of the applicant, of the premises, or of adjoining premises owned by the applicant. In the case of *on* licences, the powers of the licensing authorities have been altered by the Act of 1904, and they can only refuse to renew an *on* licence on the following grounds:—(1) That the premises have been ill-conducted; (2) that they are structurally deficient or unsuitable; (3) that the character or fitness of the proposed holder of the licence is unsatisfactory; or (4) that the renewal would be void. In all other cases when the licensing justices do not approve of a renewal being granted they must make a report to the committee of quarter sessions in counties and boroughs other than county boroughs, and

to the whole body of justices in county boroughs. (The city of London is for this purpose to be treated as a county borough.) The report is considered, and if a renewal is refused, compensation under the act must be paid. The compensation is provided by the trade, and is paid out of a fund, contributions to which are levied on the licensed premises in the county, or other area created by the justices in quarter sessions, and in the county borough, at a rate fixed, within limits laid down by the Act of 1904, by the quarter sessions of counties and the whole body of justices of county boroughs.

Provisional Licences.—Application may be made for the provisional grant and confirmation of an *on* licence for premises in course of erection or about to be erected. Plans must be submitted and approved, and, when the premises are complete, the licensing authority, if satisfied that the plans have been adhered to, may declare both the provisional grant and confirmation to be final.

Transfer of Licences.—At the general annual licensing meeting, and at special sessions held from four to eight times a year, application may be made for the transfer of licences. The holder may desire to transfer premises to another tenant, or a transfer be required on account of the death, sickness, or bankruptcy of the holder, or because of premises being pulled down for public purposes or becoming unfit for use by reason of fire or some other cause. Applications for the removal of a licence from one place to another are treated as applications for new licences.

Six-day and early closing licences may be granted at the request of the applicant. The premises must be closed on Sundays, and one hour before the regulation time on week days, and the holder is entitled to remission of one-seventh of the excise duty.

Occasional licences are granted by the commissioners of police in the metropolitan police district, and by two justices elsewhere, for the convenience of the public attending cricket matches, races, etc. They authorize a licensed person, for a period not exceeding three consecutive days, to sell liquor between sunrise and 10 p.m. in some other place than his licensed premises.

A register of licences is kept in every licensing district, and all convictions for offences against the Licensing Acts are entered in it, and the justices must have regard to these entries upon any application for the grant, renewal, or transfer of a licence. Licensed premises must be closed during the following hours:—In

the county of London, from midnight Saturday till 1 p.m. on Sunday; from 11 p.m. on Sunday till 5 a.m. on Monday; other days from 12.30 p.m. till 5 a.m. Outside the county of London, but within the metropolitan police district, or in a town or populous place containing 1,000 inhabitants, from 11 p.m. on Saturday till 12.30 p.m. on Sunday; from 10 p.m. on Sunday till 6 a.m. on Monday; other days from 11 p.m. till 6 a.m. If situated elsewhere, from 10 p.m. on Saturday till 12.30 on Sunday; from 10 p.m. on Sunday till 6 a.m. on Monday; other days from 10 p.m. till 6 a.m. In Wales and Scotland they must be closed during the whole of Sunday.

By the Act of 1902 all clubs in which intoxicating liquors are supplied to members or their guests are required to be registered, and stringent regulations are enacted for the prevention of abuses.

The law with regard to Scotland was consolidated with amendments by the Licensing (Scotland) Act, 1903. For the most part the law is the same as in England, with the exclusion of the special provisions of the English Act of 1904, but the constitution both of the licensing and appeal courts is changed. For each burgh being a county of a city, and for each royal, parliamentary, or police burgh with a population of 7,000, and for each burgh with a population under 7,000 but of or exceeding 4,000, the magistrates of which had under the existing acts power to grant certificates, a separate licensing court is established consisting of all the magistrates of the burgh. Appeal courts, for hearing appeals and applications for confirmation of new licences, are constituted under section 4, and the second schedule of the act for burghs which are counties of cities; for royal, parliamentary, or police burghs with a population of 20,000; for all royal, parliamentary, and police burghs in one county having a population exceeding 7,000 and under 20,000. Appeal courts for counties, or the licensing districts of a county, are also constituted in accordance with section 4 (3) and the third schedule of the act, consisting of equal numbers of justices and county councillors.

In Ireland the law of licensing is contained in separate acts for the most part, though the important English Act of 1872 applies to Ireland. The law, however, is largely the same, with the exclusion of the provisions of the English Act of 1904. The Licensing (Ireland) Act, 1902, provides that until after 1907 no licence shall be granted for

the sale of intoxicating liquors, whether for consumption on or off the premises, except (1) by way of renewal, (2) for a hotel, or (3) for a railway refreshment room. See Paterson's *Licensing Acts, 1828-1904* (16th ed. 1905); and for Scotland, Dodd's and Macpherson's *Licensing Guide* (1903).

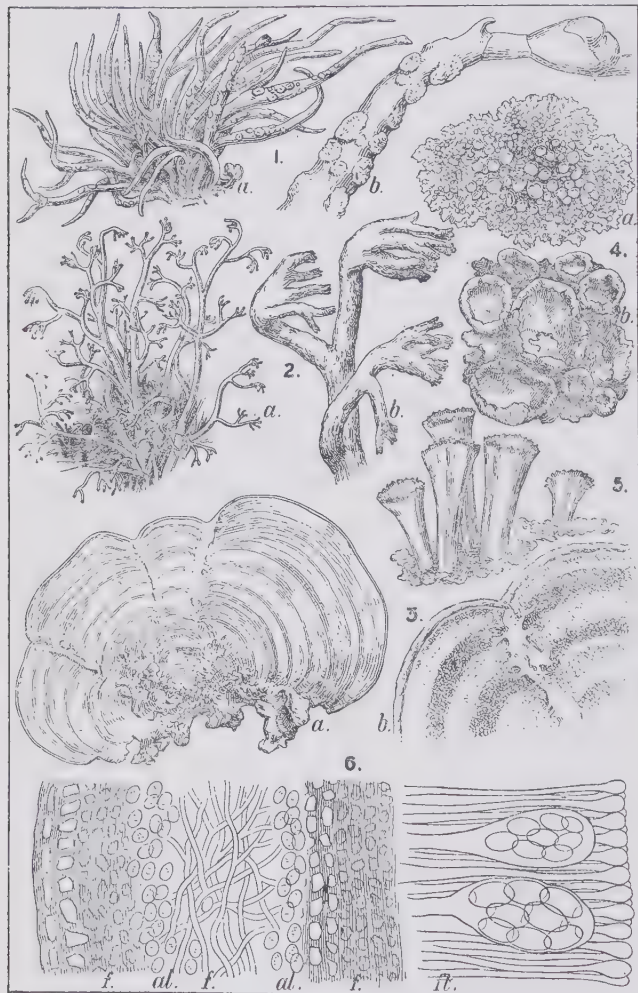
Lichen (Gr. *leichen*, 'canker') is described by some as a popular form of eczema, by others as a distinct disease. It is characterized by the eruption of numerous small red spots which are slightly elevated above the skin, and it may be either localized or widely distributed over the whole body. Soothing lotions or powders usually cure it very rapidly. A more chronic and intractable form, however, is known as *lichen ruber*, which occurs in older people. In this variety the papules coalesce to form patches of uniform induration. In treatment, arsenic has been found of most service; but local applications, such as ointments of tar and zinc, are also useful.

Lichenin, or MOSS STARCH, occurs in many lichens, notably Iceland moss, from which it may be extracted by boiling water as a gelatinous solution. It is used as a food in invalid cookery.

Lichens are the familiar vegetable growths clothing the stems and branches of trees with their shaggy fronds, or forming brilliantly coloured patches on roofs, walls, and even on rock-surfaces near the seashore. Some are of commercial value; litmus and orseille are obtained from species of the genus *Roccella*; the so-called Iceland moss (*Cetraria islandica*) is used as a demulcent. The Laplanders feed their reindeer in the winter on *Cladonia rangiferina*, and the Tartars make 'earth-bread' from an encrusting form which grows on rocks in the steppes. Up to about forty years ago lichens were considered to be independent plants of imperfect organization, forming a division of cryptogams with the Fungi and the Algæ, and were believed to derive their nourishment from the medium in which they grew—i.e. from the atmosphere. In 1866 De Bary suggested that they were to be classed as a division of Fungi—that is to say, what had been generally regarded as an independent organism really consisted of two plants, a fungus and an algal, associated for the benefit of both. This suggestion of De Bary's was worked out by Schwendener, who gave it to the world as the 'dual hypothesis.' After a long and heated controversy among specialists, the truth of this dual hypothesis may be said to have been demonstrated by the in-

vestigations of Reess, Stahl, and Bornet, who have shown that it is possible to separate the two members of the partnership, by breaking up the lichen into fungus and algal, and to combine the two elements so as to form the compound growth. Thus a lichen may be defined as a symbiotic

sortium. The green plant absorbs from the air carbon dioxide, which under the influence of light is broken up, and the resulting starch grains are incorporated by the threads of the mycelium of the enclosing fungus, which in turn supplies the algal cells with water. The function of the algal



Types of Lichens.

1. *Rocella tinctoria*: a, natural size; b, portion magnified. 2. *Cladonia rangiferina*: a, natural size; b, portion magnified. 3. *Cora pavonia*: a, natural size; b, portion magnified. 4. *Physcia parietina*: a, natural size; b, portion magnified. 5. *Cladonia pyxidata*, natural size. 6. Microscopic details of a lichen, transverse section: f, fungoid portion; al, algal portion; ft, fruit.

organism, consisting of one of the higher Fungi (Schwendener at first thought only Ascomycetes, but one of the Basidiomycetes also occurs) and a single-celled or thread-like algal, intimately connected, and with a compound thallus, technically called a *con-*

partner is vegetative, the apothecia or fructifications being produced by the fungus. Theoretically lichens should be referred to the groups to which the respective partners belong; but in practice it has been found more convenient to treat them

as a separate class, with two subclasses (Ascolichenes and Hymenolichenes) according to the systematic position of their constituent fungi. In the first subclass these are all ascomycetous, producing spores in little transparent sacs; in the second subclass, with but a single genus (*Cora*, which is tropical), the fungus is a basidiomycete, in which the spores are developed on a club-like support.

Lichfield, munic. bor., co. in itself, and city, in Staffordshire, England, 16 m. S.E. of Stafford. The cathedral, commenced in the 12th century and completed in the 15th, is one of the most beautiful in England, its most striking feature being the three graceful spires. The church of St. Chad, of the time of Henry VII., is near the site of the hermit's cell (7th century). Dr. Samuel Johnson was a native. Brewing is carried on. Pop. (1901) 7,902.

Lichtenberg, suburb of Berlin. Pop. (1900) 43,372.

Lichtenberg, GEORGE CHRISTOPH (1742-99), German philosopher and satirist, born at Oberamstadt, near Darmstadt; was appointed professor at Göttingen (1769). He was distinguished for his philosophical essays, but still more for his witty burlesques of the inflated style of Lavater and others. His *Gesammelte Schriften* appeared in 14 vols. (1844-53), *Briefe* in 1901, and *Aphorismen* in 1902. See Grisebach's *Gedanken und Maximen aus Lichtenberg's Schriften*, with Life (1871).

Lichtenburg, tn., cap. Lichtenburg dist., Transvaal Colony, British S. Africa, 35 m. S. of Zeerust. Pop. 700.

Lichtenstein, tn., Zwickau, Saxony, Germany, on Rödlitz R., a tributary of the Mulde, 45 m. S.E. of Leipzig. Pop. 5,837.

Licinius, GAIUS LICINIUS CALVUS, surnamed 'Stolo,' was famous in early Roman history as the statesman who practically ended the long struggle between the patricians and plebeians. He was consul in 364 and in 361 B.C.

Licinius, whose full name was PUBLIUS FLAVIUS GALERIUS VALERIUS LICINIANUS LICINIUS, was emperor of Rome (307-324 A.D.). In 313 he conquered Maximinus, and secured undisputed sway over the Eastern empire. He was soon engaged in war with Constantine—first in 315, when he lost the provinces of Greece, Macedonia, and most of the lower valley of the Danube; then again, after a peace, in 323, when two great defeats at Adrianople and Chalcedon placed him at the mercy of Constantine, who put him to death.

Licking River, Kentucky, U.S.A., a l. bk. trib. of the Ohio. It rises in the S.E. part of the state, and flows N.W. to its junction with the main stream.

Lick Observatory, an astronomical establishment founded by James Lick of San Francisco (1796-1876) at a cost of £140,000. He chose a site on the summit of Mt. Hamilton, at an altitude of 4,280 ft., and enjoined by will the erection there of the most powerful telescope in the world. The instrument is a 36-inch refractor by Alvan Clark, and had no rival for a number of years. The body of James Lick lies beneath the dome.

Lictors, the name of the attendants of the magistrates in

school (1846-55), dean of Christchurch, Oxford (1855-91), and vice-chancellor (1870-4). He is best known as the author, with Dean Scott, of the standard *Greek Lexicon* (1843; 8th ed. 1897). He also wrote a *History of Rome* (1855).

Liddesdale, dist. of Roxburghshire and Dumfriesshire, Scotland, comprising the area drained by the river Liddel and its tributaries. It is the country of the Armstrongs and Elliots; Hermitage Castle, associated with Bothwell and Mary Queen of Scots, is in the district.

Liddon, HENRY PARRY (1829-90), English divine, who, as vice-principal of Cuddesdon College (1854), vice-principal of St.

Lidford Law, an old English proverbial expression, meaning to hang a man first and try him afterwards. It is said to have arisen from the extremely summary procedure of a court held in the town of Lidford in Devonshire. The proverb ran,—

'First hang and draw,
Then hear the cause by Lidford law.'

See also HALIFAX LAW.

Lidner, BENG T (1757-93), Swedish poet, born at Göteborg, who in his seventeenth year distinguished himself at the University of Lund by his poetical gifts and by his notoriously irregular life. Expelled from Lund, he completed his studies at Greifswald and Rostock; was befriended



Lick Observatory.

ancient Rome, their duties being to escort them, to demand due respect for them from passers-by, to execute their orders, and, in particular, to inflict punishments.

Licuala, a genus of dwarf tropical palms, with terminal, fan-shaped leaves and prickly stalks. Among the species are *L. grandis*, a native of New Britain; *L. Rumphii*, from Borneo; *L. elegans*, from Sumatra; and *L. horrida*, from the Indian archipelago.

Lida, tn., Vilna gov., W. Russia, on the Lida, 50 m. S. of Vilna city, cap. of dist. Pop. (1897) 8,626 (half Jews).

Liddell, HENRY GEORGE (1811-98), English classical scholar, was headmaster of Westminster

Edmund's Hall, Oxford (1859), Ireland professor of exegesis (1870), a select preacher at Oxford, and canon of St. Paul's (1872-90), impressed his remarkable personality on the age. The intimate friend of Pusey, he lived in close sympathy with the Oxford movement; but he considered that the action of the extreme ritualists imperilled its progress. In 1882 he resigned his professorship, and later he travelled in Egypt and Palestine, and visited Döllinger at Munich. He wrote several volumes of *Sermons*, and *A Life of E. B. Pusey*, completed by Johnston and Wilson (1893-7). See Donaldson's *Five Great Oxford Leaders* (1900), and Russell's *H. P. Liddon* (1903).

by Gustavus III., who sent him as secretary to the Swedish minister at Paris. See his *Samlade Arbeten* (1877).

Lido, chain of sandy islets, Italy, between rivers Brenta and Piave, and separating the lagoons of Venice from the Adriatic Sea. There are several forts on them. Since 1894 the chief sea entrance to Venice has been by the Lido channel.

Lie, JONAS LAURITS IDEMIL (1833), Norwegian novelist, born at Ecker, near Drammen. He first became popular when he published a volume of poems (1866); but his real domain is the novel. Beginning with *Den Fremsynte* (1870), a tale of the Finmark peasantry, he followed this up with a whole series of ex-

cellent romances, which include *Tremesteren Fremtid* (1873; Eng. trans. *The Barque 'Future'*, 1879); *Lodsen og hans Hustru* (1874; Eng. trans. *The Pilot and his Wife*, 1879); *Livssløven* (1883; Eng. trans. *One of Life's Slaves*, 1895), one of his most powerful stories; *Kommandøren Døttre* (1886; Eng. trans. 1892); and *On-de Magter* (1890). Lie's novels are realistic, his psychology is keen and delicate, his characterizations are vivid and convincing, and his tone is always noble, even when pessimistic. See Jæger's *Illust. Norsk Litter* (1892).

Lie, MARIUS SEPHUS (1842-99), Norwegian mathematician and linguist, born at Nordfjord. The chair of mathematics at Christiania was founded for him (1872); there he remained till appointed professor of geometry at Leipzig (1886). He published *Theorie der Transformationsgruppen* (1888-93), and *Vorlesungen über Differentialgleichungen mit bekannten infinitesimalen Transformationen* (1891).

Lieben, tn., Bohemia, Austria, on the riv. Moldau, N.E. suburb of Prague. Manufactures chemicals, machinery, sugar, and beer. Pop. (1900) 21,300.

Liebermann, Max (1849), German painter, born in Berlin. He went to Barbizon (1874), and came under the influence of Millet, Corot, and Daubigny, the result being seen in such paintings as *Labourers in a Turnip Field*. One of his best pictures is *The Flax Spinners*, in the Berlin National Gallery.

Liebig, JUSTUS, FREIHERR VON (1803-73). German chemist, was born at Darmstadt, and after a not very successful school career, was apprenticed to an apothecary, previous to entering the University of Bonn, and later Erlangen. After taking his degree (1822) he went to Paris, and worked with Gay-Lussac until appointed professor of chemistry in Giessen (1824). In 1852 he was called to Munich, where he remained till his death. Liebig's work was principally on, though not confined to, organic chemistry; investigating, both alone and in conjunction with Wöhler, many compounds of which the constitution was of great theoretical importance—such as the fulminates, benzoic acid, amygdalin, and others; whilst he discovered chloral (1831) and chloroform (1832). He worked out also much of the chemistry of the life processes of animals and plants, and in this connection did good service in elucidating the chemical actions occurring in agriculture and cooking, and in inventing the extract of meat with which his name was connected (now known as 'Lemco'). In the

course of his researches he developed the methods of organic manipulation and analysis, those in use to-day being much the same as he left them. It is as a teacher, however, that Liebig is perhaps most famous, founding much of that which is best in modern experimental methods of teaching chemistry, and stimulating by his inspiring influence and individual instruction a host of pupils who afterwards spread his clear and logical doctrines over the world. Besides his numerous monographs on scientific subjects, Liebig wrote *Die Chemie in ihrer Anwendung auf Agrikultur und Physiologie* (1840), *Die Naturgesetze des Feldbaues* (1842), and *Chemische Briefe* (1844); took a part in the production of a dictionary of chemistry; founded the *Annalen der Chemie und Pharmazie* (1832); and edited the *Jahresbericht der Chemie*. See Hofmann's *The Life-work of Liebig* (1876), and Sherrington's *Justus von Liebig* (1895).

Liebknecht, WILHELM (1826-1900), German socialist agitator and journalist, born at Giessen. Imprisoned for his share in the Baden rebellion, he escaped in 1849 to England. Amnestied in 1862, he entered the N. German Parliament (1867). He founded, with Herr Bebel, the *Demokratisches Wochenblatt*; which led to the imprisonment of both (1872-4). On his release Liebknecht entered the Reichstag, of which he continued a member, with short interruptions, for twenty-five years. From 1890-1900 he edited the socialist organ *Vorwärts*, and was the author of *Zur Grund- und Bodenfrage* (1876), *Geschichte der Französischen Revolution* (1890), *Robert Owen* (1892), and other works.

Lieblein, JENS DANIEL CAROLUS (1827), Norwegian Egyptologist, born at Christiania. In 1839 he was accredited representative of Norway at the opening of the Suez Canal. He has travelled much in Egypt, and is the author of many works on Egyptology in French and German, as well as in his native tongue.

Liebrecht, FELIX (1812-90), German folklorist and linguist, born at Namslau. From 1849 to 1867 he was professor of German at Liège. His collection of monographs on folklore, *Zur Volkskunde* (1879), is a classic. His works also include translations of Basile's *Pentamerone*, with a preface by Jakob Grimm (1846); *Barlaam und Josaphat* of Johannes Damascenus (1847); and the *Otia Imperialia* of Ger-vase of Tilbury (1856).

Liechtenstein, PRINCIPALITY OF, small independent state bounded on the N. and E. by the prov. of Vorarlberg, Austria, on

the W. by the Rhine, and on the S. by the Swiss cantons of Grisons and St. Gall. It is extremely mountainous, being traversed N. and S. by the Rhetian Alps. The climate is mild, and the people are largely engaged in agriculture—corn, vines, flax, and fruit being cultivated. The chief town is Vaduz. The principality is practically Austrian. The reigning family dates from the 12th century. Liechtenstein is governed by the constitution of 1862, modified in 1878, 1895, and 1901, which provides for a diet of fifteen members. Since 1866 it has belonged to the Austrian Customs Union. The inhabitants pay no taxes, nor are they liable for military service. Area, 65 sq. m. Pop. (1901) 9,477.

Liège. (1.) Province of E. Belgium, on both sides of the Meuse, and diversified by outliers of the Ardennes (2,200 ft.). The S. of the province yields coal, iron, marble, lead, and zinc. Butter and cheese are made. Industries include the working of iron and steel, the making of machinery, cutlery, weapons, woollens, cloth, cottons, and glass; carrier pigeons are extensively reared. Area, 1,117 sq. m. Pop. (1900) 826,175. (2.) (Flem. *Luik*; Ger. *Lüttich*), tn. and episc. see of Belgium, cap. of above prov., on the Meuse, 55 m. S.E. of Brussels. The industries include the manufacture of machinery, tools, bicycles, railway material, firearms, cannon, linen, woollens, leather, zinc goods, sugar, beer, and spirits. The church of St. Jacques dates from the 11th century; St. Paul's, from the 10th to the 16th century; St. Bartholomew's, of the 11th and 12th centuries; Ste. Croix and St. Martin's, from the 10th century. The law courts, built in 1508-40, were long the residence of the prince-bishops. The city is famous for its university, attended by over 1,000 students. It fell before Marlborough in 1702. It is defended by a ring of modern forts. Pop. (1901) 157,760, the majority being Walloons.

Liegnitz, tn., Silesia, Prussia, at confluence of the Schwarzwasser and Katzbach, 45 m. N.W. of Breslau. Manufactures cloth, machinery, pianos, shoes, tobacco, oil, woollens, and pottery. The town, which dates from the 11th century, was the residence of the dukes of Lower Silesia after 1163. On the Wahlstatt, near the town, Silesians, Poles, and Teutonic Knights fought a fierce engagement with the Mongols in 1241. Pop. (1900) 54,882.

Lien. A lien may be particular or general. A particular lien is a right which one person has to retain the property of another until a debt due in respect of that

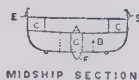
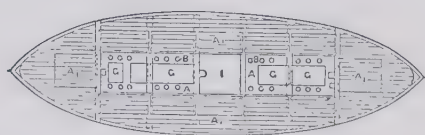
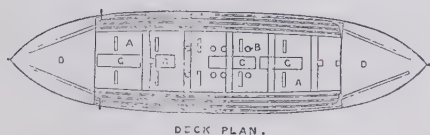
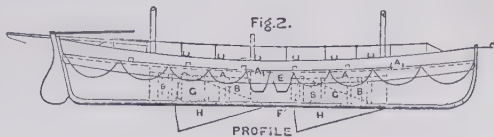
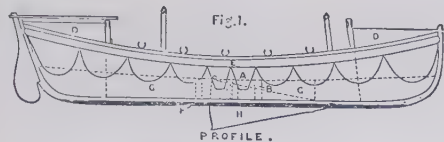
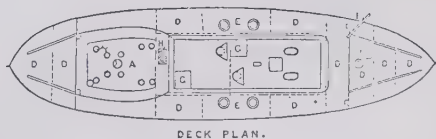
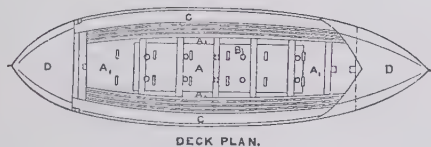
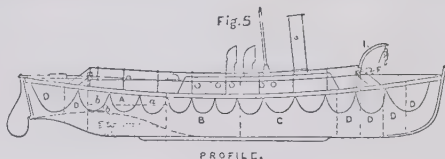
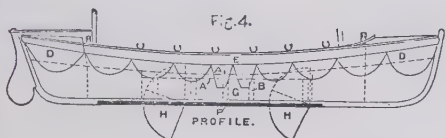
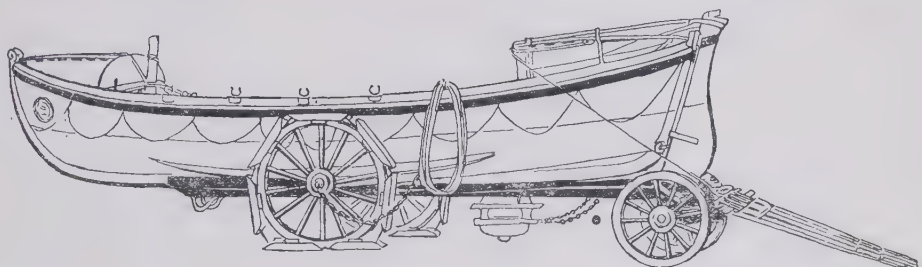


Fig. 3.



Lifeboats of the Royal National Lifeboat Institution.

FIG. 1. Self-righting boat. FIG. 2. Norfolk and Suffolk type. FIG. 3. Self-righting boat on transporting carriage, fitted with Tipping's wheels for traversing soft sand. FIG. 4. Watson type. FIG. 5. Steam lifeboat. References to Figs. 1, 2, and 4:—A, The deck; A₁, side deck (in Fig. 2); S, relieving valves for the automatic discharge of water off the deck; C, side air-cases above deck and thwarts; D, end air-compartments; E, wale or fender; F, iron keel ballast; G, water-ballast tanks; H, drop-keels; I, cable-well (in Fig. 2). References to Fig. 5:—A, Cockpit—a, deck, b, propeller hatch, c, relief valves; B, engine room; C, boiler room; D, water-tight compartments; E, coal bunkers; F, capstan; G, hatches to engine and boiler rooms; H, cable reel; I, anchor davit.

property has been satisfied: for example, a watchmaker may retain a watch sent for repairs till he is paid. A general lien, again, is the right to retain property of another until a general balance of account has been liquidated. A solicitor is entitled to retain in his possession his client's papers, and money acquired in his professional capacity, so long as his client remains indebted to him. Bankers, innkeepers, factors, dyers, and calico-printers have all general liens. When once possession is parted with, the lien, as a rule, is gone. On the other hand, a lien continues although the debt itself has become statute-barred. The holder of a lien has no right to sell it; but see *INNEKEEPER*. A vendor's lien attaches when the purchase-money has not been wholly paid. As to goods, it is regulated by the Sale of Goods Act, 1893; and as to land, it amounts to a mortgage on the property, and is good against a purchaser with notice.

Lierre, or **LIER**, *tn.*, Belgium, prov. of Antwerp, 9 m. S.E. of Antwerp; manufactures silks, boots and shoes, cutlery, lace, and sugar. Pop. (1900) 22,656.

Liesing, *s.w.* suburb of Vienna, Austria; manufactures chemicals, candles, and textiles. Pop. (1900) 6,890.

Liestal, *cap.* of Basel-land, Switzerland, on the Ergolz, 8 m. S.E. of Basel; manufactures gloves and ribbons. Pop. (1900) 5,488.

Lieutenancy, COMMISSION OF.

See *LONDON—Government*.

Lieutenant and Second-lieutenant. Officers of the ranks of lieutenant and second-lieutenant are, in the British army, collectively denominated 'subaltern officers' or 'subalterns.' Their duties in the field are to command the troops of a squadron in the cavalry (see *SQUADRON*), half-companies in the infantry, and sections of two guns and two wagons in the field-artillery batteries. In camp or quarters they also command these bodies and attend to their interior economy, under the orders of their respective captains. There is no difference between the duties of a lieutenant and those of a second-lieutenant. See *The King's Regulations for the Army*.

Lieutenant and Sub-lieutenant, in the navy. After a satisfactory examination at the Royal Naval College in gunnery, navigation, pilotage, seamanship, and torpedo practice, a midshipman, if he is nineteen years of age and has completed the prescribed service, is promoted to be a sub-lieutenant; but if he secures a 'first-class' in the subjects of examination, he at once obtains his commission as a

lieutenant. Sub-lieutenants who have attained the age of twenty-five are eligible for promotion to lieutenants after two years' service, including one year's probationary service. A lieutenant may be promoted to the rank of commander for distinguished service, or on completing four years' service as lieutenant.

One of the chief duties of a lieutenant is that of officer of the watch, in which capacity he is responsible for the safety of the ship. Among his general duties are to see that all on board subordinate to him perform their work 'with diligence and propriety,' to keep a log-book or journal, and to supply and inspect the clothing of the crew. A sub-lieutenant's duties are of a less responsible nature. A lieutenant in the navy ranks with a captain in the army, and, after eight years' service, with a major. See *The King's Regulations for the Navy*.

Lievín, *tn.*, dep. Pas-de-Calais, France, on Souchez R. and Lens Canal, 9 m. N. of Arras; has important coal mines. Pop. (1901) 17,600.

Life. See *BIOLOGY*; see also *ESTATES, ASSURANCE, PEERAGE, and PRESUMPTIONS*.

Lifeboats, boats primarily designed for saving life at sea. The institution of the lifeboat system, which is now of world-wide extent, was due to the initiative of a few private individuals, although an 'insubmersible' boat had been previously invented in 1785 by Lionel Lukin, a London carriage-builder. The subscribers to the newsroom at the Law House, S. Shields, suggested the construction of boats for the purpose, when, in 1789, the ship *Adventure* of Newcastle was stranded on the Herd Sands at that place, and thousands of spectators helplessly watched the crew being drowned. The men of S. Shields called a meeting, and offered sums of money for the best plan of a boat for the special purpose of life-saving. Henry Greathead's design was chosen, and the principles on which he constructed his boat have been adhered to with little alteration up to the present day. If a spheroid be divided into quarters, it will be found that each portion cannot be upset in the water, or rather, cannot remain bottom upwards. Greathead took advantage of this fact, and one of the most noticeable features of the first lifeboat was that it had high projecting ends. It was not until 1823, however, that public interest in the matter was thoroughly aroused. Thanks largely to the energy of Sir William Hillary, the Royal National Lifeboat In-

stitution was founded in 1824. Depending chiefly on private support, the institution did not establish itself on a sound basis until 1850. By 1880 its annual income amounted to nearly £30,000, and its boats and influence had been instrumental in saving nearly thirty thousand lives.

The most essential qualities of a lifeboat are buoyancy, stability, self-righting power, self-emptying ability, capacity for carrying passengers, speed against a heavy sea, and facility in launching and in taking the shore. Buoyancy is given by a water-tight deck or floor, air-cases round the sides on board, and two large air-chambers, one forward and the other aft. The air-cases round the sides serve the purpose of keeping to the middle of the boat any water that is shipped—a very important consideration. Stability is given by a heavy keel of iron weighing about nine hundredweight for a thirty-three foot boat. The self-righting qualities are attained chiefly by the large elevated air-chambers in bow and stern, and by the tendency of the ballast and heavy keel to right the boat directly she capsizes. The self-emptying qualities depend upon the floor of the boat being two or three inches above the water-line, and being fitted with large holes to let the water out through the bottom. At the upper end of these holes are valves that open downwards, thus letting water out without letting it in. The strength of a lifeboat is due to its peculiar material and construction. The best Honduras mahogany is used, and diagonal planking is adopted. The planks pass right round from gunwale to gunwale, and have a layer of prepared canvas between them.

The carriage of a lifeboat is an important adjunct, enabling it to be run deep into a surf on its being launched when manned. Each boat has a set of spare oars, and is six, eight, ten, or twelve oared. Lifeboats are launched for drilling purposes every quarter, and for shipwreck as often, of course, as necessary. Some are permanently on duty, as, for instance, those near the Goodwin Sands. The Ramsgate lifeboat has a steam-tender always ready for putting to sea. The average cost of equipping a lifeboat station is £1,000, and about £70 a year is further needed for upkeep and wages. Life-saving organizations, on a plan somewhat similar to the British, exist in several other countries, and notably in America, France, and Germany. In America, the United States Life-saving Service, introduced in 1871, is largely subsidized by Congress. In France, the Life-



*'Got 'em all!' A Lifeboat Picture by C. Napier Henry, A.R.A.
(By permission from the etching by G. O. Murray, published by the Fine Art Society.)*

saving Society dates from 1865, and in Germany from the same year. Both are supported by voluntary contributions. In 1903-1904 the lives saved by lifeboats round the British coasts numbered 423. See BOATS; also Dibdin and Ayling's *The Book of the Lifeboat* (1894).

Life Guards, the premier corps of the British army, whose special duty it is to attend the sovereign. They differ from all other cavalry regiments in being equipped with the cuirass. Each regiment carries four standards. The Life Guards trace their formation back to the two troops of royalist gentlemen who followed Charles II. into exile. Their battle honours are as follows:—Dettingen, Peninsula, Waterloo, Tell-el-Kebir, South Africa (1899-1900), Relief of Kimberley, and Paardeberg.

Liferent, in Scots law, the right to enjoy property during life without wasting the substance. In the case of heritable subjects the liferenter has possession, and is entitled to take all the fruits—*i.e.* the whole annual value—but he must not cut timber or work minerals. He is liable for all taxes and other burdens, and must keep the subjects in proper repair. A liferent of a sum of money entitles the liferenter to the interest upon it, and gives him certain powers of investing the capital upon giving security to the fiar. The liferenter of furniture is not responsible for ordinary tear and wear.

Life-saving Apparatus. By the Merchant Shipping (Life-saving Appliances) Act, 1888 (the result of the report by a Select Committee on Saving Life at Sea, 1887), a committee was appointed to frame rules with regard to the life-saving apparatus to be carried by British steam and sailing vessels. Particular attention was paid by the committee to the quantity and quality of these appliances for emigrant ships, and for this class and other classes different rules were drawn up as to the number of boats, oars, life-buoys, life-belts, life-rafts, and other appliances to be carried by each class. The Act of 1888 is repealed and its provisions re-enacted by the Merchant Shipping Act, 1894.

The principal instrument in saving life at sea is the life-belt, one of the best being that invented for the National Lifeboat Institution by Commander J. R. Ward in 1854. It consists of cork fastened on canvas, and is buoyant, strong, and flexible, sustaining in the water not only a heavily-clothed man, but a comrade as well.

Another important appliance is the Ryder hammock, a cork mat-

tress, which enables three men to float in the water in an upright position. Other apparatus consists in seats for ships' decks, life-preserving dresses, life-pillows, india-rubber cloth life-jackets and belts. Recently a novel but serviceable apparatus for saving life at sea has been tried. It consists of a sheet-iron raft provided with oars and several watertight compartments, and capable of carrying fifty or sixty people. At the International Exhibition in Paris in 1900, four hundred and fifty-five competitors gave in specimens of life-saving appliances for the Andrew Pollok prize of £4,000, but not one of them was considered worthy of the honour.

With the lifeboat the *rocket apparatus* forms the principal means of saving life on the coasts of the United Kingdom and America. This, unlike the lifeboats, is the exclusive property of the Board of Trade. We owe the rocket apparatus to John Dennett of Newport, Isle of Wight. In 1853 there were a hundred and twenty stations in the United Kingdom supplied with his apparatus, which is worked in the following manner:—A rocket is fired, which carries a line over the ship; the crew haul in the rocket line, and this brings an endless rope (called a whip), rove through a block with a tail attached to it, which they make fast to a mast or some other portion of the wreck high above the water. Those on shore then haul off to the ship a hawser attached to the whip, which is fastened to the mast or other portion of the wreck. The sling life-buoy is next sent to the vessel, and is hauled back with an occupant. This process is repeated till all, or as many as possible, are saved.

During the year ending June 30, 1905, 173 lives were saved by the rocket apparatus, making a total of 8,515 saved since 1870. There are 221 life-saving stations on the British coasts, with 4,204 volunteers. See *Instructions relating to the Rocket Apparatus for Saving Life from Shipwreck* (1904), issued by the Board of Trade.

Liffey, riv., Leinster, Ireland, rises in the Wicklow Mts. 12 m. s.w. of Dublin, and after a course of 70 m. flows into Dublin Bay.

Lifts. The term 'lifts' is usually applied to those contrivances for mechanically raising passengers, or such bulky loads as freight wagons, from one floor of a building to those above—the most common examples being the lifts or elevators in modern high hotel or office buildings. The motive power for these is now either hydraulic or electric. The use of steam-power is practically

restricted to lifting from coal mines and other deep-level shafts; while gas-engines are only employed for small lifts in isolated situations where no installation of electricity or water-under-pressure is available.

For hydraulic lifts, see **HYDRAULIC MACHINERY**.

In electric lifts, the cage is suspended by ropes passing round pulleys at the top of the shaft, and wound by a grooved drum driven by the motor. An essential quality of any motor is that of high speed, so that some system of gearing is necessary to transmit power to the winding-drum. Worm-gearing is now almost universally adopted. The worm-spindle, which is usually driven direct by the motor, runs in collar or ball bearings which take the lateral thrust. The worm or screw is of quick pitch, and turns in an oil-bath, together with the worm-wheel, with which it engages, and which is keyed to the shaft of the rope-drum. In the Sprague lifts adopted for the Central London Ry. stations, two worms, right and left handed, are fixed on each spindle, and gear with two worm-wheels, so that lateral thrust on the bearings is avoided. The motors for these, at 470 revolutions a minute, give a lift speed of 200 feet a minute.

Starting and Stopping Gear.—Some regulating gear is required for starting electric lifts, as, when switched on from a standstill, the current available is that due to the full electro-motive force of supply—nearly twenty times as great as the working current, which is that resulting from the difference between the electro-motive force of supply and the back electro-motive force of motor. To prevent the dangerous jerk which would thus be caused, it is usual to insert resistance in the motor circuit, and to provide a switch which (generally automatically) gradually cuts out this resistance as the current falls to the proper limit.

An automatic magnetic brake is usually provided, so that the cage is stopped when the circuit is purposely or accidentally broken, and released when the current is switched on again.

Safety Appliances.—In all forms of suspended lifts, whether worked by hydraulic power, steam, gas, or electricity, it is essential that some device should be employed by which the cage may be stopped with absolute certainty in the event of a breakage of the suspending ropes; and in most modern lifts two or more separate systems are provided, so that the failure of one might not involve a disastrous accident. The means most commonly employed include some form of safety catches,

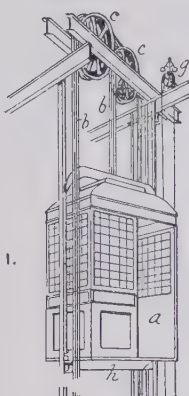


Fig. 1.

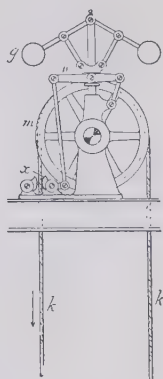


Fig. 2.

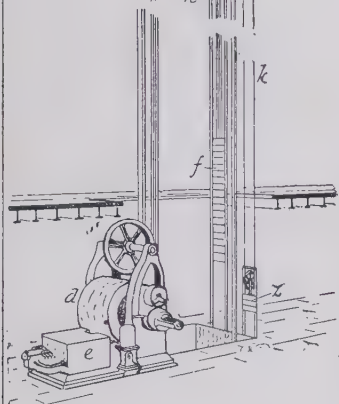


Fig. 3.

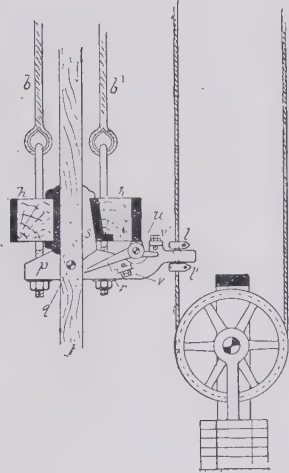
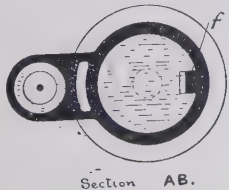
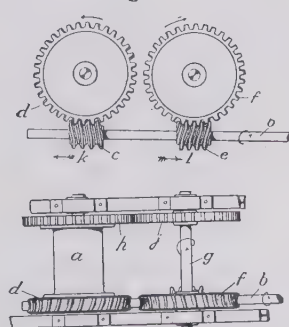


Fig. 4.



Explanation of References.

Fig. 1. Electric Lift.

a, Cage; b, b', ropes suspending the cage; c, c, pulleys; d, winding drum; e, electric motor; f, balance weights; g, centrifugal governor; k, rope operating governor, kept taut by weight z.

Fig. 2. Details of Centrifugal Governor in Fig. 1.

h, h, Plank or platform carrying cage; b, b', ropes suspending the same; k, k, light rope passing through a lug on plank; l, l, stops causing rope k to move along with cage and operate wheel m, and, by means of bevel gear, the centrifugal governor g; p, a balance beam pivoted at g, carries the plank and cage; r is a knife lever on spindle u, and s a loose wedge between plank h and guide column t. (The parts b, b', p, g, r, and t are duplicated at the other end of the plank.) If rope b breaks, the beam p tilts up and forces the knife lever r into the guide column by the nut screw v; as the cage still descends, the knife lever forces the wedge s upwards, fixing the plank h to the column t, and so stopping its descent. Should the rope b' break, the beam is tilted in the opposite direction, and the nut v' acts on the knife lever in the same manner. If the ropes remain intact, but the cage descends too rapidly, by means of the rope k the governor g is rotated so rapidly that the balls fly outwards, raise the lever w, and thus cause the cams x to grip the rope k between their serrated edges; this prevents the rope from passing downwards with the cage, causing it to tilt the balance-beam p by the stops l, l, producing the same effect as a broken suspension rope. The main advantage of this arrangement is that it is independent of the suspension ropes of the cage.

Fig. 3. Buffers.

On the bottom plank a of the lift are fixed four or more hydraulic cylinders, as shown. As the lift reaches the bottom of its course, the piston b being then at the bottom of the cylinder c, the lower end d of the piston rod comes into contact with a block of wood on the floor of the lift chamber, and as the lift continues to descend, the piston b is forced upwards in the cylinder c, the water passing from the upper side to the lower through the slot e. In the side of the cylinder is a wedge-shaped projection f, which gradually closes the slot e, obstructing the passage of the water and gradually stopping the lift. When the lift rises the piston falls to the bottom of the cylinder by its own weight, the water passing upwards through it by the valve g, which opens only in an upward direction.

Fig. 4. Worm-gear as used on the Sprague Lift.

a, Drum on which the rope is wound; b, shaft driven by a motor; c, a right-hand-pitch worm driving the worm-wheel d, and with it the winding drum a, in the direction of the arrow; e, a left-hand-pitch worm driving the worm-wheel f, and with it the shaft g in the direction of the arrow. The shaft g and the shaft of the winding drum a are geared together by the spur wheels h and j. As the end-thrust on worm c is in the direction of the arrow k, and that on worm e in the direction of the arrow l, the one thrust counteracts the other, and the shaft b is thus subject to no end thrust.

which are released by any break in the tension of the ropes, and grip the guide-rails with a force sufficient to bring the cage at once to rest. Another system includes a centrifugal governor, which allows the safety clutches to come into action when the speed of the cage passes a certain limit.

In addition to one or more of these devices, all modern lifts are fitted with safety buffers, which would neutralize the dangerous force of even the most direct fall of the cage.

Moving Stairways.—Where economy of space and of time are not primary objects, vertical lifts may in some cases be replaced by travelling stairways or inclined planes, which carry passengers upwards with a continuous though somewhat slow movement. They were first introduced in the Paris exhibition of 1900. Though of various makers and patents, the principle in all is much the same. An endless belt, from 20 in. to 23 in. wide, was stretched over two pulleys, above and below, and was carried on intermediate friction-rollers so as to obviate any tendency to sag. Hand-rails were provided on each side, travelling at the same rate as the main belt—a speed of about 2 ft. a second. Electric motors were used as the driving power, the requisite reduction of speed being obtained by the use of belts, worm-wheels, and spur-gearing in the different patterns of way. The cost of working was found to be less than that of vertical electric lifts for heights of two or three stories, but more for lofty distances.

Lifts in the shafts of coal mines differ from other forms of lifts in their extreme height (up to 2,300 ft.) and in the speed with which the cage has to be drawn up. Steam is invariably used as a motive power, the cage being drawn up by a steel wire rope passing over the headgear and wound on a drum. The chief difficulty is to secure uniformity in the demands on the engine, owing to the great weight (compared with the useful load) of the moving parts, particularly that of the winding-rope. To counter-balance the variations due to the rapidly-changing suspended length of the latter, it is usual to have a balance or tail rope fastened to the cage and passing round a pulley at the shaft bottom. The adoption of a spiral winding-drum of varying radius (generally of a conical form) answers the same purpose, but adds to the weight, and consequently to the friction and inertia of the moving parts.

In a new colliery in S. Wales, with shafts 2,200 ft. deep and 20

ft. diameter, the cages (two in each shaft) weigh 5 tons each, and carry a useful load of 5 tons. The pit-head pulleys are 18 ft. in diameter, and each also weighs 5 tons, the winding drum being of plain cylindrical pattern, 17 ft. 6 in. in diameter, and weighing 35 tons without the shaft. At each wind, which occupies fifty seconds, a loaded cage is drawn up and an empty one let down, the cages being guided by four steel wire-rope conductors (to each cage) 1½ in. diameter, loaded at the bottom end with a dead load of 17 tons, while two division ropes hang between the cages to prevent them from colliding when passing each other. The winding ropes are 1½ in. diameter, weigh 20 lbs. a yard, and are stressed (at the commencement of the wind) to one-ninth of their breaking weight of 180 tons.

Ligaments, tough fibrous bands which connect together the articular extremities of bones. They are chiefly composed of white fibrous tissue arranged in bundles which interlace or lie parallel with each other, and they have a white, shining, silvery aspect. Some ligaments consist entirely of yellow elastic tissue whose elasticity allows of its acting as a substitute for muscle.

Ligan, or **LAGAN**. See **FIOT-SAM**.

Ligao, tn., prov. Albay, Luzon, Philippines, 15 m. N.W. of Albay; produces rice, sugar-cane, hemp, and indigo. Pop. (1896) 17,370.

Ligature, in surgery, is a thread or wire used for the purpose of occluding the circulation in a diseased or injured blood-vessel, or of preventing hæmorrhage or discharge from the pedicle of a tumour which has been removed. Various substances are employed as ligatures. In occluding a blood-vessel it is desirable that a material be employed which is capable of absorption after it has kept the vessel closed sufficiently long for the formation of a blood clot which permanently seals the opening. Catgut and fine silk are the ligatures in most common use, but kangaroo tendon and other animal substances are sometimes employed for special reasons. When early absorption of the ligature is impossible or undesirable, a material such as silver wire should be used, which is readily encapsuled by animal tissues, and which is unlikely to cause mechanical irritation. In all cases the ligature must be aseptic, as otherwise it may lead to serious mischief. An external ligature in the form of a tourniquet or an elastic band is frequently applied to a limb to control hæmorrhage either after an injury or during an operation. Such a ligature must, of course,

be situated between the site of the wound and the heart.

Light is, primarily and subjectively, any effect on our sense of sight; secondarily and objectively, it is the changing condition in the external world which corresponds to or produces this sensation. In ordinary experience we see an object by means of the light which comes from it to us; but it is only within the last century that we have formed any clear idea as to what it is which comes. The earliest scientific view of the nature of light was that it was a material emanation radiating from the luminous body in straight lines so long as the medium through which it passed remained the same. Now, however, it is recognized that light is a particular kind of motion in a medium believed to fill all space and permeate all matter. (See **ÆTHER**.) The motion is a wave motion, and is propagated through free space with a speed of 186,000 m. per second. Through space occupied by matter the speed of propagation is reduced in a ratio depending upon the nature of the matter.

The changes which may occur in the character of a ray of light which falls upon a material surface or passes into or through a portion of matter are infinitely various. The direction of the ray is in general changed (see **REFLECTION** AND **REFRACTION**), and the changes are different for the rays of different colour. (See **DISPERSION** AND **SPECTRUM**.) Usually absorption takes place of a selective character, so that certain constituents of the original ray are more absorbed than others, giving rise to all the variety of colour present in nature. (See **COLOUR**.) If the matter is transparent, the absorption is never complete; the ray emerges deprived of some of its original energy. Most of this absorbed energy takes the form of heat; but under certain conditions it is thrown off again as a ray of a colour quite different from that of the ray which has been absorbed. (See **FLOURESCENCE**.) If the medium is a crowd of small particles, as in the case of moonlight shining through a transparent fleecy cloud, colour effects are produced which are explicable only in terms of a wave theory of light. (See **DIFRACTION** AND **INTERFERENCE**.) The colours of soap films and the thin wings of certain insects are explained on the same principle of the mutual interference of contiguous rays of light. Then, again, there is the property possessed by many crystalline substances of dividing a single ray into two separate refracted parts, one of which follows the ordinary law of refraction, and the other

a peculiar law. This is the phenomenon of double refraction, closely associated with which are the many remarkable properties of polarized light. (See POLARIZATION OF LIGHT.)

Light is only a part of the radiation given out by luminous bodies. In general these also emit heat rays and actinic rays, which differ from the light rays in their inability to affect our sense of sight. But just as the ear cannot hear sounds whose frequencies of vibration lie outside certain limits (see ACOUSTICS), so the eye cannot perceive as brightness ether waves whose wave-lengths are longer than the wave-length of red light, and shorter than the wave-length of violet light.

When a solid is gradually heated up to the temperature of a low red heat, experiment shows that, before a distinct redness appears, a colourless and shifting gray glimmer is observed, and that a steadiness in luminosity is not attained until the dark-red colour appears. This proves that some part of the eye is sensitive to rays of longer wave-length than that of red light—to those, namely, which lie just beyond the dark red of the spectrum. It is further known that when coloured light is diminished sufficiently in brightness, the eye is unable to distinguish the colour. Thus it would seem that the eye responds more quickly to the stimulus of mere brightness or luminosity than to the stimulus of colour; and it has been suggested that this difference may be connected physiologically with the rods and cones, the two well-known structures present in the sensitive part of the human eye. See EYE and VISION.

Light and Air. By Lord Tenterden's Act, 1833, a tenement which has enjoyed continuously for twenty years the access of light to it through certain apertures or windows is entitled for ever to the uninterrupted enjoyment of light, unless the right has been enjoyed under an agreement in writing. Windows so entitled to light are called 'ancient lights.' The right may be lost by acquiescence in interference, and may be enforced by an action for damages or an injunction. But to constitute an actionable obstruction of ancient lights it is not enough that the light is less than before. There must be a substantial privation of light, enough to render the occupation of the house uncomfortable according to the ordinary notions of mankind, and, in the case of business premises, to prevent the plaintiff from carrying on his business as beneficially as before

(*Coles v. Home and Colonial Stores, Ltd.*, L.R. 1904, A.C. 179). The right to air apart from light is more difficult to sustain. The air must come through an aperture. Thus a windmill has no right to air. In Scotland 'ancient lights' are unknown, as a right to light and air can only be acquired by express grant. See Hudson and Inman on *Light and Air* (2nd ed. 1905), and Gale on *Easements* (7th ed. 1899).

Light Cure. See FINSEN, N.B.
Lighter and Lightermen. Lightermen are persons employed in connection with lighters: these are flat-bottomed boats used to load or unload vessels in the docks or elsewhere. Thames lightermen are licensed, after an apprenticeship and oral examination, by the Watermen and Lightermen Company, a body which was incorporated in 1827.

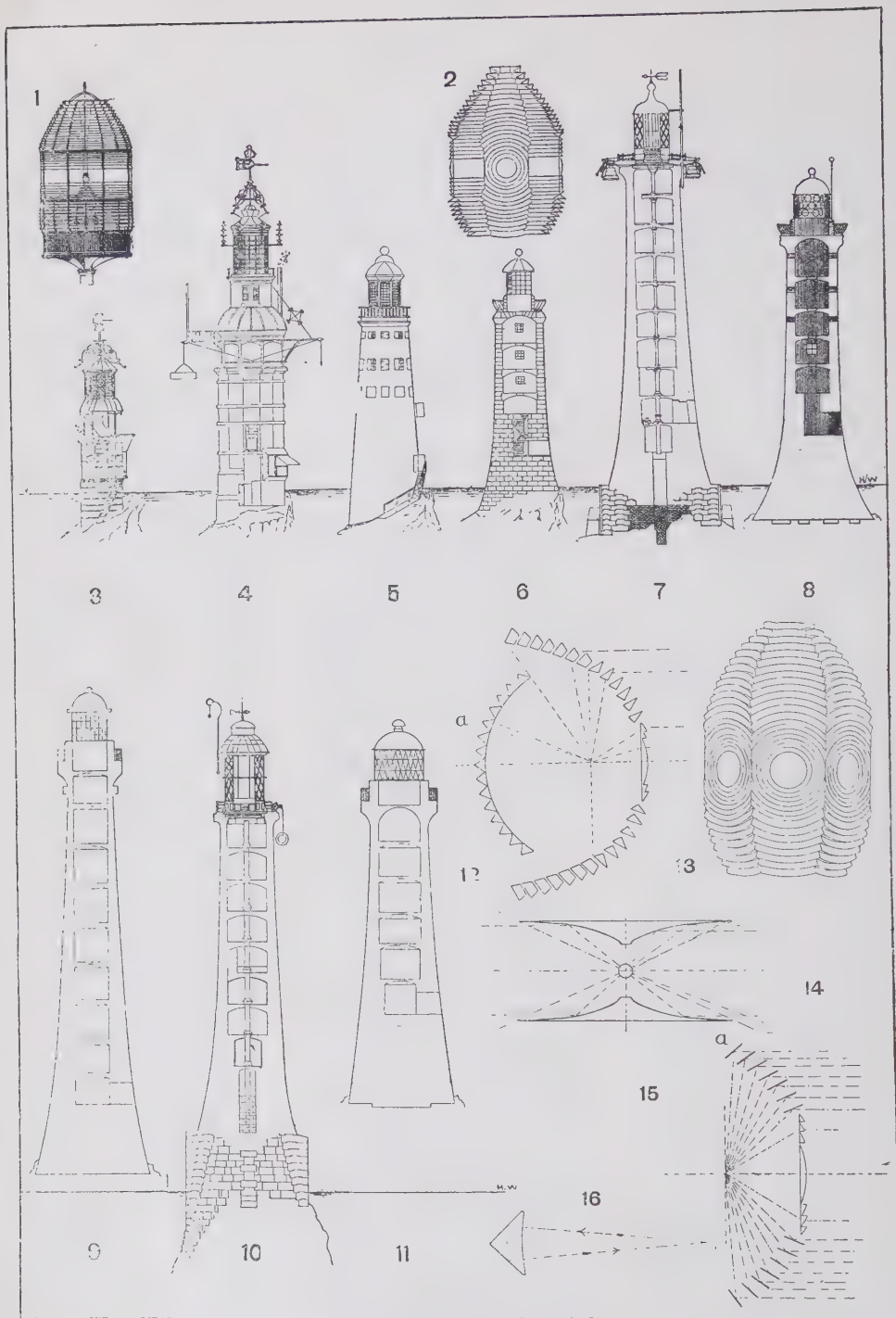
Lightfoot, JOHN (1602-75), English divine, whose Hebrew and rabbinical scholarship make him one of the greatest Biblical commentators England has produced. He became master of Catharine Hall, Cambridge (1643), vice-chancellor of the university (1654), and sat in the Westminster Assembly (1643). He was also rector of Much Munden, Hertfordshire, for nearly thirty years. His principal works are *Harmony of the Four Evangelists*, unfinished (1644-50); *Harmony, Chronicle, and Order of the Old Testament* (1647); and *Horæ Hebraicæ et Talmudicæ* (1658-74). See Pitman's Life, prefixed to his edition of *Lightfoot's Works* (13 vols. 1822-5), and Welton's *John Lightfoot, the Hebraist* (1878).

Lightfoot, JOSEPH BARBER (1828-89), English prelate and New Testament scholar, was born at Liverpool. After a brilliant career at Trinity College, Cambridge, he was elected a fellow of his college (1852), Hulsean professor of divinity (1861), and Lady Margaret professor (1875), with the additional honours of Whitehall preacher (1866), canon of St. Paul's (1871), select preacher at Oxford (1874), and bishop of Durham (1879). Lightfoot's commentaries on the epistles of St. Paul, *Galatians* (1865), *Philippians* (1868), *Colossians* and *Philemon* (1875), furnished with suggestive dissertations, belong to the highest order of Biblical scholarship. His most outstanding work is perhaps his edition of the apostolic fathers, *Clement of Rome* (1869; Appendix, 1877), and *Ignatius and Polycarp* (1885); while in his telling critiques of *Supernatural Religion* (1889) he rendered important service to the cause of Christianity. Other publications of note were *On a Fresh Revision of the Eng-*

lish N.T. (1871), an edition of Mansel's *Gnostic Heresies* (1875), several volumes of sermons, ordination addresses, and essays, besides many articles in magazines and dictionaries.

Lighthouse, a tower or lofty building erected on the coast, or on some rock at sea, and provided with a light which can be seen from a considerable distance. The most famous of ancient lighthouses was the Pharos of Alexandria; but, until comparatively modern times, such public works were few and very inefficient. One of the earliest British lighthouses was that built on the Eddystone, about 14 m. from Plymouth. (See EDDYSTONE LIGHTHOUSE.) Another famous lighthouse modelled on Smeaton's principles is that of the Bell Rock, built by R. Stevenson (1807-10). It lies 12 m. off the coast of Forfarshire, and is exposed to the assaults of the North Sea. The Skerryvore light stands 12 m. off the island of Tiree in Argyllshire, and was built in 1838-43 by Alan Stevenson. The Bishop Rock lighthouse was erected after designs by James Walker (1858), and was altered by Douglass (1889). It stands between the Scilly Isles and the Lizard. Other notable British lights are those of the Dhu Heartach Rock, 14 m. off the isle of Mull; Casquet Rocks, near Alderney; Chickens Rock (1869), off the Calf of Man (1869-74); Smalls Rock (1778; rebuilt 1861); Needles (1858); St. Catherine's, Isle of Wight (1780; altered 1840); North Uist (1858); and Hanois Rock (1862).

In the lighting of lighthouses either metal or glass may be used for reflection. Reflection is either 'catoptric,' where metal only is used, and the rays by contact are reflected; or 'dioptric,' where glass alone is used, and where the rays are refracted. It may also be 'catadioptric,' when both glass and metal are employed. The first application of scientific lighting principles was in the parabolic reflector of Hutchinson of Liverpool in 1777. The light represented the focus of the parabola, and the reflector was parabolic—i.e. shaped like the inside of a saucer, but formed of a number of plane facets. The system was further applied to lights that were intended to show all round the horizon. This was effected by fixing a number of parabolic reflectors round the light, whether the light was fixed or revolving. It was found, however, that by having a number of reflectors the light could not be equalized over the whole horizon. There was always a darker interval between the concentrated rays of each



Some great Lighthouses and their Lanterns.

1. Fresnel's fixed light apparatus: cylindrical refractors. 2. Stevenson's combination: alternate panels of cylindrical refractors and of holophotal apparatus for revolving lights. 3. First Eddystone Lighthouse, by Winstanley; 4. Second, by Winstanley; 5. Third, by Rudyerd; 6. Fourth, by Smeaton; 7. Fifth, by Douglass. 8. Bell Rock Lighthouse. 9. Skerryvore. 10. Bishop Rock. 11. Dhu Heartach. 12. Section of perfect form of dioptric holophote for oil flame: *a*, double-refracting prisms. 13. Stevenson's holophotal for revolving lights. 14. Section of Bordier Marcet's parabolic reflector for distributing light equally round the horizon. 15. Fresnel's catadioptric combination: *a*, metallic reflectors. 16. Diagram showing action of double-refracting prisms (as in Fig. 12)

reflector. To obviate this, and distribut the light equally round the horizon, a light was devised in 1819 by Mons. Bordier Marcet. This light had two reflectors of parabolic pattern, formed by revolving a parabola horizontally round a vertical axis passing through its perimeter. The same light represented the focus of each.

In 1822 and the following years Augustine Fresnel brought about a revolution by introducing glass lenses, glass cylindrical refractors, and totally-reflecting prisms. The first idea was a development of annular lenses which had been previously used for heat only and not for light. The lenses were cut in rings with a common centre, and were like steps ascending one from another. A small space in the centre was dome-shaped. This was the first advance in the direction of dioptric illumination, the reflector being in front of the flame. His next development

The different kinds of lights shown on lighthouses are as follows:—(1.) The fixed light. (2.) The revolving light, which comes into full view gradually, and as gradually disappears. (3.) The flashing light, which, at intervals of a few seconds, comes very quickly, though gradually, into view, and as suddenly disappears. (4.) The coloured light. (5.) The intermittent light, which is suddenly turned on and off at fixed intervals. (6.) Intermittent light of unequal periods; for instance, fixed for two seconds, eclipsed for five, fixed for two, eclipsed for two, and then fixed for two as at first, and so on. (7.) The group flashing light, where two or more flashes are followed by an eclipse of some seconds. (8.) Fixed lights illuminating the whole horizon, but showing revolving or intermittent characteristics over certain areas. The differences are effected by masks arranged like venetian blinds. (9.) The intermittent flashing light, a succession of quick flashes followed by a dark interval.

The nature of any particular light is set forth in the various *Pilots*, which are issued under authority of the Admiralty. Oil is found to provide a very satisfactory illuminant, but electricity and gas, as well as acetylene, have their advocates, and are employed in many lighthouses.

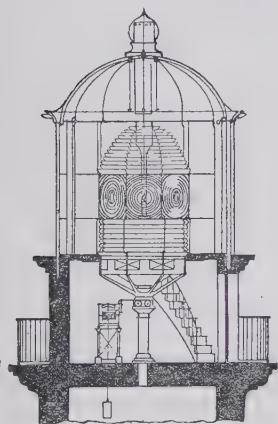
The construction, management, and upkeep of lighthouses are provided for by tolls paid by shipping, and known as 'light dues.' These are fixed by Privy Council orders. English lighthouses are under the management of Trinity House; Scottish ones under the Commissioners of Northern Lights; Irish ones under the Ballast Board of Dublin. Many British lights in the colonies are under the Board of Trade. In the United States there is a special Lighthouse Board.

See numerous papers in *Proceedings of Inst. of Civil Engineers*, by Chance, Douglass, and others; Fresnel's *Mémoire sur un nouveau Système d'Eclairage des Phares* (1822); Stevenson's *Lighthouse Construction and Illumination* (1881); and Admiralty and other charts, *Sailing Directions*, and *List of Lights* (compiled annually to December 31).

Lightning, the bright flash characteristic of thunderstorms. Its identity with an electric spark, long suspected, was demonstrated by Franklin, who by means of a kite tapped a thundercloud of some of its charge. The first stage in the genesis of a thunderstorm is the establishment of a difference of electrical potential in the atmosphere. A thundercloud is, in fact, a mass

of water-drops at an average electrical potential very different from that of the earth or of neighbouring clouds. This produces an electrical stress in the air, which is in the end unable to support the stress. The discharge takes place in the form of one or more lightning flashes, and the noise of the discharge is heard in the thunder-roll. The generally zigzag course of the lightning is due to the presence of dust nuclei in the atmosphere. When the discharge takes place from the cloud to the earth, there is not infrequently observed a double or even a triple flash along paths nearly coincident. This is believed to be due to an oscillatory discharge, such as is known to occur in the case of Leyden jars under certain conditions. The nature of the electric field and the configuration of the clouds will no doubt affect the character of the flash in detail, just as the electric spark is modified according to the nature and shape of the conductors and their distance apart. The two familiar types of lightning are forked lightning and sheet lightning, and these probably correspond to the spark discharge and the glow discharge from an electric machine. A curious and comparatively rare form of lightning is the ball lightning, which has the appearance of a luminous ball floating through the air until it comes in contact with a solid body, when it explodes sharply. This phenomenon, the existence of which can hardly be doubted, still awaits explanation. It has never been obtained artificially.

Lightning Conductors.—The violence of the explosion with which a lightning flash passes constitutes a source of danger both to life and to buildings. Protection to the latter is secured by the use of lightning conductors, which are a means for facilitating the discharge from the electrified cloud to the earth. A flat strip or round rod of metal, preferably copper rather than iron to prevent rust, passes from the earth to above the highest point in the building, and terminates in one or more spikes. When an electrified cloud passes over, it induces a charge of electricity in the ground beneath (see ELECTRICITY, ELECTROSTATICS), which, in trying to get as near to the cloud as possible, collects on the spikes. It is often discharged from the spikes as a brush or silent discharge, appearing as a blue flame at the points (sometimes called St. Elmo's fire), and the electric pressure is relieved and the flash averted. This is one of the most useful actions of the lightning rod. But if the cloud above becomes sud-



Cupola of a first-class Lighthouse.

was the cylindrical refractor, consisting of a glass cylinder the face of which was cut all round after the manner of his first lens, the flame being in the centre. This distributed the light all round, not in one direction only.

The totally-refracting prisms which Fresnel next introduced consisted of glass cut on an improved pattern, so that each ray was reflected once and refracted twice in a horizontal direction.

In another design Fresnel effected further great improvements, and made his glass refractors, instead of Marcet's metal reflectors, the primary light-directing influences. Thus the apparatus was entirely constructed of totally-refracting prisms; and this arrangement is still the basis of lighthouse illumination all over the world.

denly electrified, perhaps by a flash from a higher cloud, there is no time for the brush discharge to act, and a flash is inevitable. This will naturally make for the nearest point, and usually strikes the rod, along which the electricity flows to earth without damage.

For this to occur some precautions are necessary. A long or wide building will not be completely protected by one rod. Every high point should be guarded, and even intermediate parts, so that no part of the roof is far from a rod. Also the rods

advise that all large masses of metal should be connected together by wires, and connected to the conductors, including the iron gutters and pipes, and all should be well connected to the earth. The American system is very similar. But Sir Oliver Lodge and Mr. Killingworth Hedges recommend that, while carefully connecting such masses of metal and pipes to the earth, they should not be connected to the conductors proper, and the latter should be kept away from them. This is chiefly on account of the uncertainty of the earth

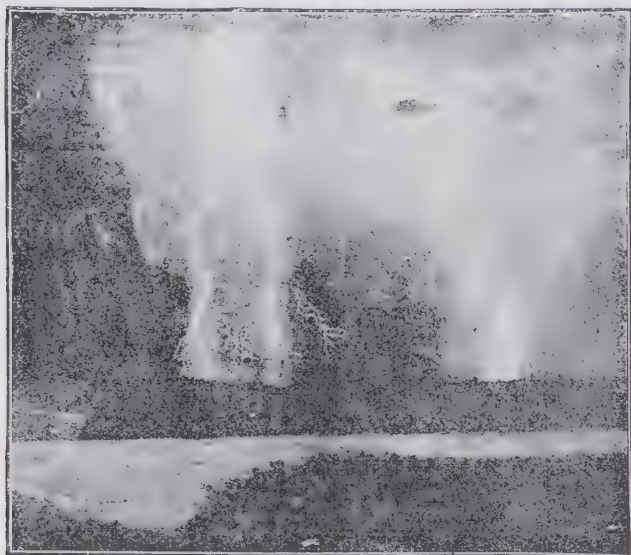
lightning flash pass, and a safe path to earth must be provided. One end of a thick wire or rod is connected to the earth, and



FIG. 1.

the other end brought close to the line, with a gap so narrow that the lightning will easily jump across, though the smaller electrical pressure of the system is unable to do so. But often in these systems the other pole of the dynamo is joined to earth, and the current in the line, though unable to jump the gap by itself, can follow in the path of the lightning, since the great heat of the flash causes the air to become a conductor of electricity, and the following current keeps up the heat. Therefore means are employed to stop the electric flame as soon as the almost instantaneous lightning flash has passed. The two sides of the gap are continued upwards as outwards curving horns (Fig. 1), up which the flame is driven by the rising of the heated air, assisted by the magnetic repulsion of the arc, due to the current in the wires and horizontal parts of the horns. An electro-magnet placed under the gap and actuated by the current hastens this action.

Fig. 2 shows this combination, with connection to dynamo, line, and earth. If the dynamo current attempts to follow by the arc to earth, the current must pass through the coil, thus magnetizing the core and blowing out the arc. The coil also acts as a choking coil, to prevent the



Photographs of Lightning Flashes.

must go as straight as possible down to earth. Any loop or large re-entrant bend is objectionable. The rods should be one quarter of an inch square if of copper, or larger for iron. Lastly, the connection to earth must be made of low electrical resistance by connecting to a large metal plate in wet soil, or to a large iron water main. If the soil is dry, a load of coke packed round the plate improves the earth connection. The plate may have nails driven through it from both sides, to improve the contact with the soil.

The system is improved by connecting the rods together with horizontal wires, thus making a large network of conductors over the building, and the horizontal rods may advantageously have short aigrettes of metal projecting upwards. If the roof is covered with metal, this should be connected in many places to the conductors. The German rules

connection of pipes, and the liability of bad metallic contact of the sections. The general principle is to surround the building and cover the roof with a network of conductors, and to give the lightning many and easy paths to earth. The continuity of the conductors and the efficient connection to the earth should be tested from time to time, and all joints should be strongly made and frequently examined.

The question is being carefully considered by the Lightning Research Committee of 9 Conduit Street, London, W. See Sir O. J. Lodge's *Lightning Conductors* (1892), and rules of the *Electrotechnischer Verein* of Germany.

Lightning Arresters. (See also TELEGRAPHY, TELEPHONY, and LIGHTNING.) A system for transmitting power by an electric current consists of a dynamo at one end of the line, and usually motors or transformers at the other. Through neither can a

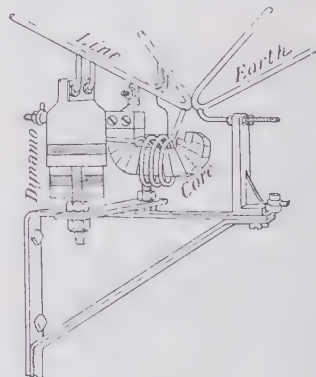


FIG. 2.

lightning flash passing to the dynamo, thus forcing the flash to travel by the spark gap to earth.

Fig. 3 gives a diagram of the connections for this arrester.

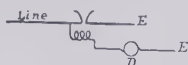


FIG. 3.

In another type of arrester the electro-magnet pulls away one of the poles, thus lengthening the gap until the arc breaks.

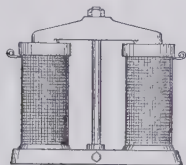


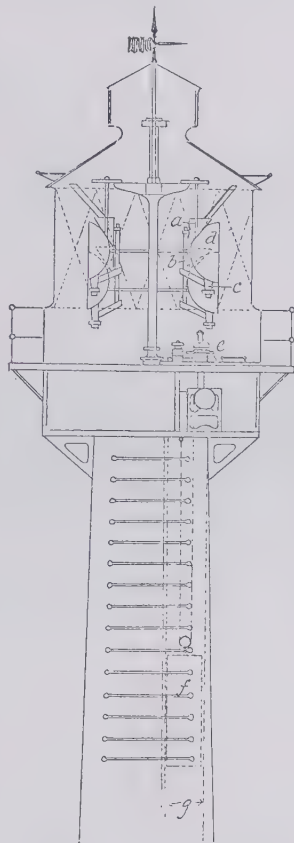
FIG. 4.

A third type contains a very large number of narrow gaps, produced by placing a pile of discs of metal and mica alternately. The top disc is connected to line, and the bottom disc to earth. The lightning easily jumps the narrow gaps, but the cooling effect of the mass of metal prevents the dynamo current from maintaining the arc. Fig. 4 shows a double arrester on one earthed base. The metal used for the discs is usually zinc, as the arc is more easily extinguished between poles of zinc than of other metals, due probably to the rapid oxidation of the zinc.

Light Railways. See RAILWAYS.

Lights, in public worship. There is no direct evidence that lights were ceremonially used during the first three centuries of the Christian era. Some, however, consider that the 'many lights' at Troas, and the 'candlesticks' and 'lamps before the throne,' mentioned in Rev. 1:12 and 4:5, indicate their early adoption in churches. In the fourth and following centuries they were almost universal (Smith's *Dict. of Christian Antiquities*, ii. 993-8). St. Jerome alludes to the use of lights at the reading of the gospel as symbolic of the light of the Word of God (*Ep. adv. Vigilant*, iii.). Until the reformation lights were placed in British churches either on the altar or on a shelf above it. They were discontinued in the Prayer Book of 1549, and it is a moot point whether they are now permitted by the 'Ornaments Rubric.' Archbishop Benson pronounced for the legality of their use on condition that they are lighted before the commencement of the service, and are extinguished after the service is concluded (*Read and Others v. The Lord Bishop of Lincoln*, Judgment, pp. 65-80).

Lightship, a vessel moored out at sea with a light to mark a bank, shoal, or place dangerous to mariners. The first British lightship was fitted out by Robert Hamblin in 1731 to mark the Nore Sand; and David Avery caused one to be placed to mark the Dudgeon Shoal, Norfolk (1736). Since that date lightships have become very common. The oldest of the Goodwin lightships dates from 1795. The crews usually serve for a month or six weeks, and after a spell of leave return for another similar period. Some of the newer lightships in use are of 250 tons' displacement, 103 ft. long, 23½ ft. wide, and 12 ft. 10 in. deep. Lightships are under the supervision of Trinity House.



Lantern of a first-class Lightship.

a, Oil receptacle; b, tube leading to lamp; c, lamp; d, reflector; e, clock; f, weight, moving in tube g.

Light-Year, the distance traversed by light in one year, equivalent to nearly six billion miles, is the unit adopted for the measurement of sidereal space.

Ligne, CHARLES JOSEPH, PRINCE DE (1735-1814), Austrian soldier, diplomat, and author, born at Brussels. He served with distinction through the Seven Years' war, and commanded the Austrian artillery at the siege of Belgrade (1789). During the reign of Joseph II. he held high diplomatic posts, was a favourite of Marie Theresa and of Catherine of Russia, and included Rousseau, Voltaire, Frederick the Great, Wieland, Schlegel, and Goethe among his friends. His *Mélanges* were published in thirty-four volumes (1790-1811); *Œuvres Posthumes* (1817); *Vie du Prince Eugène* (1809). His memoirs and letters, collected by Mme. de Staël (1809), are of considerable historic importance. See Lives by Thürheim (1876) and Du Bled (1890).

Lignin, or woody fibre, is the product into which the cellulose first formed in a plant is converted, by incrustation with other compounds, probably belonging to the aromatic series, when changed into wood in the process of lignification. This causes a change of composition from that shown by the formula $(C_6H_{10}O_5)_n$ to that approximately expressed by $C_{12}H_{18}O_9$; and though in different woods the product differs considerably in physical structure, its composition and behaviour towards reagents present very similar features in all.

Lignites, or 'brown coals,' are mostly light, friable, and porous, showing their vegetable origin by the retention of the woody structure, or sometimes also of the shapes of leaves, stems, and pieces of bark. In burning they give out much smoke, comparatively little heat, and a somewhat unpleasant odour. Chemically they represent an intermediate stage between wood and coal. Nearly all lignites are of recent geological age as compared with coals, though they may be converted into coal by the heat of igneous masses, or by pressure and earth movement. See COAL.

Lignum Rhodii, the wood of *Convolvulus scoparius*, a shrubby species of bindweed, a native of the Canaries. The wood is often known as rosewood by distillers of essential oils, and the oil distilled therefrom is sometimes used to dilute attar of roses, whose fragrance it distantly resembles. The term is also applied to the wood of *Amyris balsamifera*, a Jamaican tree.

Lignum Vitæ, the wood of a West Indian tree, *Guaiacum officinale*, the duramen or heartwood of which is of a dark greenish colour, and very hard, heavy, and cross-grained—extensively used for machinery, rollers, pebbles, ship's blocks, etc. It

contains a quantity of the resin of guaiacum, by virtue of which it is much employed in pharmacy. (See GUAIACUM.) The *Lignum vitae* of New Zealand is the aki, a giant climber, *Metrosideros buxifolia*, order Myrtaceæ.

Ligny, vil., prov. Namur, Belgium, 27 m. s.s.e. of Brussels. Here the Prussians were defeated by Napoleon two days before the battle of Waterloo (1815). Pop. (1900) 1,831.

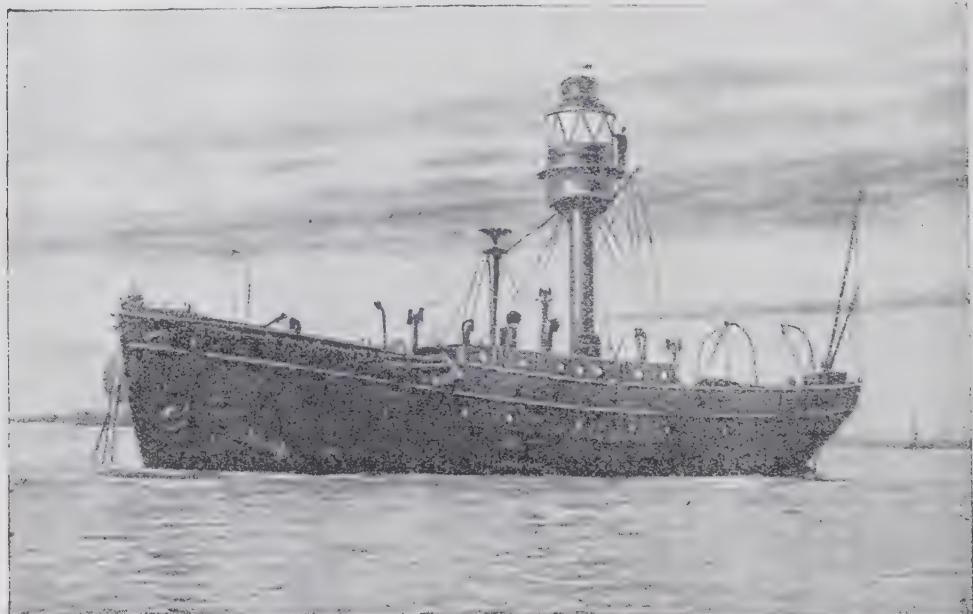
Ligonyi. See ELGON.

Ligor (Siam. *Lakhon*), chief Siamese prov. in the N.E. of the isthmus of Kra, in the Malay Peninsula; capital is Ligor, on N. side of Lakhon Bight. Tin-mining is the main industry of the province. Pop. Ligor circle (1901), 572,915, 75 per cent. Siamese.

Liguori, ALFONSO MARIA DI, SAINT (1696-1778), a Neapolitan of good family, one of the greatest Roman Catholic writers of the 18th century, and the founder of the Congregation of the Redemptorists (1732). His system of moral philosophy has been incomprehensible to many, including Newman, on account of the casuistry it justifies. He was canonized by Gregory XVI. in 1839, and for his scholarly exposition of the doctrines of the immaculate conception and infallibility Pius IX. named him a doctor of the church (1871). His day is August 2. His works were published in forty-two volumes (1842-7), and his letters in three volumes (1893-94); many of them have been translated into various languages.

Ligustrum, a genus of plants, order Oleaceæ, characterized by opposite, entire leaves, and by terminal panicles of funnel-shaped flowers, followed by two-celled berries. *L. vulgare*, the common privet, is a native of Britain. Other species include *L. compactum*, the fragrant-flowered evergreen; *L. japonicum*, with its varieties; the evergreen *L. lucidum*; and *L. ovalifolium*.

Li-hsi, king of Korea, succeeded to the throne (1864). Before the war of 1894-5 Korea was a bone of contention between the Chinese and the Japanese. Li-hsi stoutly resisted the encroachments of China and her efforts to prevent him sending ambassadors to other courts. He was proclaimed emperor (1897). The



The latest type of Lightship: the Tongue Lightship, Mouth of the Thames.

Ligularia, a genus of hardy, perennial, composite plants, of which two or three species are sometimes cultivated in gardens. *L. macrophylla* is a tall-growing species from the Caucasus, with large oval leaves and terminal spikes of yellow flowers; *L. Kämpferi aureomaculata* has large, variegated leaves, often mottled with white, red, or yellow. Ligularias like a moist, peaty soil.

Ligulate, a term used to describe the florets of certain composite plants, when the corolla tube ends in a straplike process on one side, as in the dandelion and chrysanthemum.

See Lives by Tannoja (1848-9), Gisler (1887), Dilgskron (1887), and Bathe (1900). See also REDEMPTORISTS.

Liguria, div. of ancient Italy, bounded on the w. by the river Varus and the Maritime Alps, on the E. by the river Macra, separating it from Etruria, and on the N. by the Po. Its inhabitants—called by the Greeks Ligyes, by the Romans Ligures—were subdued by the latter about 150 B.C.

Ligurian Republic, the name given to the republic of Genoa in 1797 by Napoleon. Up to 1802 it was ruled by the Directory. In 1805 it was incorporated with the French empire.

country has been practically under the control of Japan since the outbreak of the Russo-Japanese war, and by the treaty of Portsmouth, U.S.A. (1905), Russia recognized Japan's exclusive supremacy there.

Li Hung Chang (1823-1901), Chinese statesman, who first became known to Europeans through his association with Gordon in the suppression of the Taeping rebellion (1863). Li Hung Chang was then *taotai* (governor) of Kiang-su and generalissimo of the Chinese troops. He had previously occupied the position of financial commissioner at Su-chau (Soo-chow), to

which he was appointed in 1848, a year after he had matriculated at the Hanlin College in Peking. In 1865 he was appointed viceroy of Nanking, and two years later was transferred to the more lucrative post of the viceroyalty of Canton. He subsequently became the viceroy of Tien-tsin, and held this position till his death, also filling in the course of his career other high imperial offices. During the war with Japan (1894) he was for some time commander-in-chief of the Chinese forces, and on its conclusion negotiated the treaty of peace with the Mikado (1895). He visited the principal nations of Europe in 1896, and was everywhere received with cordiality. In 1900 he was appointed by the dowager-empress of China to negotiate with the allies for the restoration of peace after the 'Boxer' massacres and the occupation of Peking by the powers. Judged by a Chinese standard, Li Hung Chang was enlightened and progressive. He organized what fleet the country boasted of at the time of the war with Japan, started native trading companies, and did something towards opening up China's mineral resources by the support he gave to the construction of railways. See Douglas's *Li Hung-chang* (1895).

Lilimjörd, or LIMEJÖRD, arm of the sea, 85 m. long, between the North Sea and the Kattegat, bisecting N. Jutland. In the wider part of it, the so-called 'Broads,' lie the islands of Engholm, Gjöel, and Oland. There is steamboat communication between the numerous small towns on its banks. Oyster beds have been laid down in the W. portion of the Lilimjörd, especially around Skruer.

Likin, or LEKIN, a Chinese provincial transit duty. For foreign goods, formerly subject to *likin* at many inland stations, two and a half per cent. may now be paid, instead of the custom-house duties.

Lilac, or PIPE TREE, a name given to shrubs belonging to the genus *Syringa*, order Oleaceæ. They are natives of temperate Europe and Asia, and are among the most valuable of our hardy cultivated shrubs. The flowers are small, with bell-shaped calyces and tubular corollas, and are borne in great panicles. Many of the species and varieties possess a delicate and most sweet fragrance. The common lilac, *S. vulgaris*, is perhaps the species most frequently seen, and of it there are violet, white, blue, and rose-coloured varieties. *S. chinensis* is the Rouen lilac, of rather smaller growth than *S. vulgaris*; *S. japonica* bears dense thyrses of creamy flowers during summer;

S. sosikæa is a pretty species, but its flowers are without scent; *S. persica* is the smallest of the lilacs, and of it there are several varieties cultivated in gardens.



Lilac (*Syringa vulgaris*).

1. Flower section.

Lilburne, JOHN (1614-57), English agitator, pamphleteer, and leader of the 'Levellers,' a party opposed to aristocratic power in the government. He was repeatedly whipped, pilloried, and imprisoned by the Star Chamber, and afterwards by Cromwell, for his seditious pamphlets. He subsequently became a Quaker. See LEVELLERS.

Liliaceæ, a natural order of plants, mostly herbaceous, with bulbous roots, of which a very large proportion are garden plants, valued either for the beauty of their flowers or for the flavour of their bulbs or shoots. The flowers are generally devoid of sepals, the corolla consisting of six petals. There are six stamens inserted on the petals, a three-celled superior ovary, and a single style. Among the genera are Fritillaria, Lilium, Scilla, Tulipa, Allium, Convallaria, and Hyacinthus. The onion, leek, garlic, and chive are members of this order.

Lilientron, DETLEV, FREIHERR VON (1844), German novelist and poet, was born in Kiel. Entering the Prussian army, he served in the campaigns of 1866 and 1870-71; and was employed by the German government until 1887, since when he has devoted himself to literature. Several of his novels, which include *Breide Hummelsbüttel* (1886), *Der Mäcon* (1890), and *Kriegsnovellen* (1896),

have gained a wide popularity; but his best work appears in his lyrics, *Adjutantenritte* (1884); *Gedichte* (1889); *Nebel und Sonne* (1900).

Lilientron, ROCHUS, BARON (1820), German author, born at Plön, Holstein. After holding various government appointments, he became professor of German language and literature at Jena (1852). He published *Lieder und Sprache aus der letzten Zeit des Minnesangs* (1854), and *Historische Volkslieder der Deutschen vom 13-16 Jahrhundert* (1865-9). He was appointed editor of the *Allgemeine Deutsche Biographie* by the Historical Commission of Munich in 1870.

Lilith, a female demon of Hebrew folklore, supposed to be hostile to children, and to adults sleeping alone. The name appears but once in Scripture, but is translated 'screech owl' (Isa. 34:14; A.V. margin and R.V. 'night-monster'); it is, however, of frequent occurrence in rabbinical literature, where Lilith is regarded as Adam's first wife. (See ADAM.) The word is doubtless connected with the Hebrew *layil*, 'night,' and the superstition was probably borrowed from the Babylonians. See W. R. Smith's *Religion of the Semites* (1889), and Sayce's *Hilbert Lectures* (1887).

Liliuokalani (b. 1838), queen of the Hawaiian Is., succeeded her brother, Kalakaua (1891); but in 1893 her treatment of the non-naturalized whites caused a Committee of Public Safety to call in the assistance of the United States. The queen was deposed and a republic proclaimed (1894), and in 1898 the islands were formally annexed to the United States.

Lille, walled tn. and first-class fortress near the Belgian frontier, dep. Nord, France, 66 m. S.E. of Calais. It is situated in a level district on the Deule, of great fertility, highly cultivated, and yielding large quantities of sugar beet. It is one of the chief industrial towns of France, and is specially noted for its textile factories, in which linens, cottons, velvets, ribbons, and woollen goods are produced. There are also sugar, soap, and tobacco factories, dye works, chemical works, and distilleries; large bleach fields are found in the outskirts. Among its buildings may be noted the citadel (designed by Vauban), in the N.W., the church of Notre Dame de la Treille, the town hall, the bourse, and the Palais des Beaux Arts, which contains exceptionally rich art collections. Lille was taken by the Duke of Marlborough (1708). In 1792 it successfully withstood a terrible bombardment by the Austrians. Pop. (1901) 215,431

Lillebonne (anc. *Juliobona*), tn., dep. Seine-Inférieure, France, 20 m. E. of Havre; manufactures cotton. Pop. (1901) 6,425.

Lillibullero, a scurrilous revolutionary ballad attacking the Roman Catholics, said to have been written by Lord Wharton (1686), and to have been set to music by Purcell. It takes its name from the refrain at the end

Lillo, GEORGE (1693-1739), English dramatist, born in Moorfields. His play *George Barnwell* (1731) popularized the 'domestic drama' in England, and has been frequently revived. The best of his other plays are *Fatal Curiosity* (1736) and *Arden of Feversham* (1736).

Lilly, WILLIAM (1602-81), English astrologer and prophet, born

The flowers are borne either solitary at the top of the stems, or in a loose raceme. The perianth is usually more or less funnel-shaped, with free segments. Among the best-known and most-valued species are *L. tigrinum*, the common tiger lily, a Chinese species, growing about three feet high, and bearing many-flowered racemes of spotted orange-red flowers in late summer; *L. Washingtonia*, the Californian lily, bearing racemes of mauve-tinted, white, trumpet-shaped flowers of a delicious fragrance in June. *L. pyrenaicum* bears yellow flowers. *L. speciosum*, from Japan, bears large, broad racemes of pink-tinged and pink-spotted white flowers in summer. *L. tenuifolium* is a Siberian native, bearing long, scarlet, solitary flowers. *L. pardalinum* is a tall, fine Californian species, with purple-spotted orange flowers. *L. martagon*, the well-known Turk's cap lily, bears long, pyramidal racemes of dull purplish flowers with recurved perianths. *L. davuricum* bears scarlet flowers in July. *L. longiflorum* is a beautiful Japanese lily, bearing in summer very long, fragrant, white, infundibuliform flowers. *L. Hansoni* is also a Japanese species, having orange-coloured flowers with recurved perianths, a little after the form of *L. martagon*. *L. japonicum* bears flowers white within and mauve without. *L. giganteum* grows sometimes to a height of ten feet, and displays long, green-stained white flowers in June. *L. chalcedonicum* is a native of Greece; it bears pendulous scarlet flowers with recurved perianths. *L. auratum*, the golden-rayed lily of Japan, bears very handsome white flowers striped with yellow and spotted with purple. *L. candidum*, the St. Joseph's lily, or Madonna lily, with racemes of pure white flowers in summer, is perhaps the most commonly cultivated of lilies, and also one of the most beautiful. Most lilies like a peaty soil, and all rejoice in plenty of leaf-mould. A moderately rich, heavy soil is usually desirable.

Lily, GIGANTIC, a name sometimes given to *Doryanthes excelsa*, order Amaryllidaceæ, a tall-growing Australian plant, often reaching twenty feet in height. It bears clusters of large red flowers in late summer. The fibrous tissues of its leaves are used in the making of rope.

Lily of the Valley, the popular name of *Convallaria majalis*, order Asparagaceæ, a common garden plant and rare British native. It has beautiful drooping, white, bell-like flowers borne in a long unilateral cluster, and possessed of a delicious and



1 Tiger Lily.
2 Madonna Lily.
3 Orange Lily
of Germany.
4 Large-flowered
Lily of Japan.

Some well-known Species of Lilies.

of each couplet, 'Lero, lero, lillibullero.' It helped to bring about the deposition of James II. in 1688.

Lilliput, an imaginary country on the shore of which Gulliver, the hero of Dean Swift's *Gulliver's Travels*, was wrecked. The inhabitants were so diminutive—the height of a finger's length—that they regarded Gulliver as a monstrous giant.

in Leicestershire. He issued an annual almanac called *Merlinus Anglicus, Junior* (1644-81). Butler satirized him in *Hudibras* (1636-78). See his autobiography (posthumously published 1715).

Lily (*Lilium*), a genus of hardy, half-hardy, and tender bulbous plants, of the order Liliaceæ. Most of the species have flowers of great beauty, and are therefore valued as garden or greenhouse plants.

unique fragrance. The corolla is six-cleft, and there are six stamens. The lily of the valley is a perennial plant, flowering in late spring. It thrives in slight shade, in a deeply-dug, moderately rich soil containing leaf-mould.

Lilye, or **LILY**, **WILLIAM** (? 1466-1522), English grammarian, born at Odiham. He was appointed first headmaster of the new St. Paul's school (1510), founded by Colet, and in conjunction with Erasmus he edited the *Eton Latin Grammar*.

Lima. (1.) Maritime dep. of Peru, S. America, bounded by the Pacific Ocean on the w., the dep. Junin on the E., Ancachs on the N., and Huancavelica on the S. Pop. (1896) 298,106. Area, 13,310 sq. m. The surface is mountainous, with fertile valleys on the w. slope. (2.) Capital of Peru and of above province, 7 m. from the port of Callao on the Pacific, in the valley of the Rimac. The cathedral is the most imposing building in the city; overthrown by the earthquake of 1746, which destroyed the greater part of the city, it has only recently been completely restored. Lima is the commercial centre of the country. Manufactures include pottery, iron, copper, and furniture. More than half of the inhabitants are Indians, half-breeds, Negroes, and Chinese. Lima (a corruption of Rimac) was founded in 1535 by Pizarro. Pop. over 120,000. (3.) City, Ohio, U.S.A., the co. seat of Allen co., 125 m. N.E. of Cincinnati; has large oil refineries and railway shops. Pop. (1900) 21,723.

Limasol, or **LIMASOL**, seapt. on s. coast of Cyprus, 38 m. S.W. of Larnaca; chief seat of wine and carob trade. Plaster of Paris is exported, and salt is obtained in abundance from the salt lakes in the vicinity. Pop. 8,298.

Lima-wood. See **BRAZIL-WOOD**.

Limbach, tn. in Saxony, Germany, 12 m. W.N.W. of Chemnitz; manufactures hosiery, gloves, silk, and knitting-machines. Pop. (1900) 12,241.

Limborch, **PHILIP VAN** (1633-1712), Dutch Arminian theologian, born at Amsterdam. He became a pastor at Gouda (1657), and professor of theology at the Remonstrant college in Amsterdam (1668). The work by which he is best known is *Institutiones Theologiae Christianae* (1686).

Limbourg, or **LIMBURG**, prov. of N.E. Belgium, bordered on the E. by the Meuse. It is flat, infertile in the N.W., but fertile in the E., and produces beetroot sugar, horses, and poultry. Chief minerals are iron, coal, and calamine. Area, 931 sq. m. Pop. (1900) 240,796. Chief tn. Hasselt.

Limburg, prov. of the Netherlands, between the Prussian Rhine prov. (on the E.) and the Belgium prov. of Limburg (on the W.). It is drained by the Maas (Meuse). The marshy district of Peel occupies a large portion of the north of the province. Agriculture is at a high level, the cattle being famous. Coal is mined. Cap. Maastricht. Area, 851 sq. m. Pop. (1899) 281,934.

Limburg-on-the-Lahn, walled tn. in Hesse-Nassau prov., Prussia, on the Lahn, 32 m. E. of Koblenz; manufactures tobacco and machinery. The *Limburger Chronik* is an important historical record. Pop. (1900) 8,465.

Limbus (Lat. 'edge'), in the scholastic theology, the border of hell. It was the abode of those for whom, in the nature of things, the merits of the Redeemer could not avail, but who were nevertheless not without natural goodness, either actual or possible. In Dante's *Inferno*, canto iv., Limbo appears as the uppermost of the nine circles which subdivide the place of final expiation and doom, and contains the spirits of unbaptized infants and the virtuous heathen; and the scholastics distinguished in it the *Limbus infantium* and the *Limbus patrum*, for each of these two classes respectively. They suffered no torment save the pain of loss, hopelessness, and desire. See **PURGATORY**.

Lime. When calcium carbonate is strongly heated, in such a way that the carbon dioxide can escape, it decomposes, calcium oxide or quicklime remaining, $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$. The calcium carbonate used is chiefly limestone or chalk, and yields a purer or 'fatter' lime the smaller the amount of sandy or earthy impurities present. The process is carried out in kilns, into which the calcium carbonate is regularly charged along with coal, which in burning gives out the heat required to bring about the decomposition, the lime being withdrawn periodically at the bottom. The firing may also be done by the combustion of producer gas. Quicklime is extremely infusible, and when wetted crumbles down into a voluminous white powder of calcium hydroxide or 'slaked lime,' much heat being evolved in the process. It is used for the manufacture of the refractory crucibles employed for melting platinum, and is the substance which, when intensely heated, produces the lime light. Slaked lime is slightly soluble in water, forming an alkaline solution known as *lime water*, used as a test for carbon dioxide (with which it yields a milky precipitate of calcium carbonate) and

in medicine. (See **LIME WATER**.) 'Milk of lime' is a thick liquid consisting of slaked lime suspended in water, and is the source of the hydroxide radical; for example, sodium hydroxide is obtained by boiling sodium carbonate with milk of lime. Slaked lime mixed with about three times as much sand or ashes is used for mortar and plaster—the setting chiefly depending on loss of water, followed by hardening caused by the action of carbon dioxide. For agricultural purposes, on most soils, from 50 to 100 bushels of lime per acre is an adequate dressing.

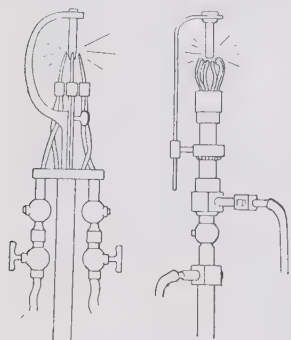


Lime Fruit (Citrus medica).
1, Section.

Lime Fruit (*Citrus medica*, var. *acidula*), is a valuable fruit of the orange and lemon tribe, and can be grown in poorer and more exposed, though not in colder, situations than either oranges or lemons. The commonest variety is the small West Indian—other well-known sorts being the mandarin lime, or sour Rangpur, and the Tahiti. The sweet lime (*C. Limetta*) is a distinct variety of *C. medica*, and is said to occur wild in the Nilgiri Hills.

Lime Light. The oxides of certain metals, such as of calcium (quicklime), magnesium, thorium, zirconium, and cerium, which are white, bad conductors of heat, and practically infusible and non-volatile, possess the property of emitting an intense light when heated. This property was first utilized by Drummond in 1824; and besides its special application in the lime light, it is also employed in the mantles of incandescent gas lamps. For the ordinary lime light, the calcium oxide, which should be as pure as possible, is cut into small cylinders,

called 'limes,' of about the dimensions of a stout wine cork. One side of such a lime is heated white hot by projecting against it a very hot and narrow tongue



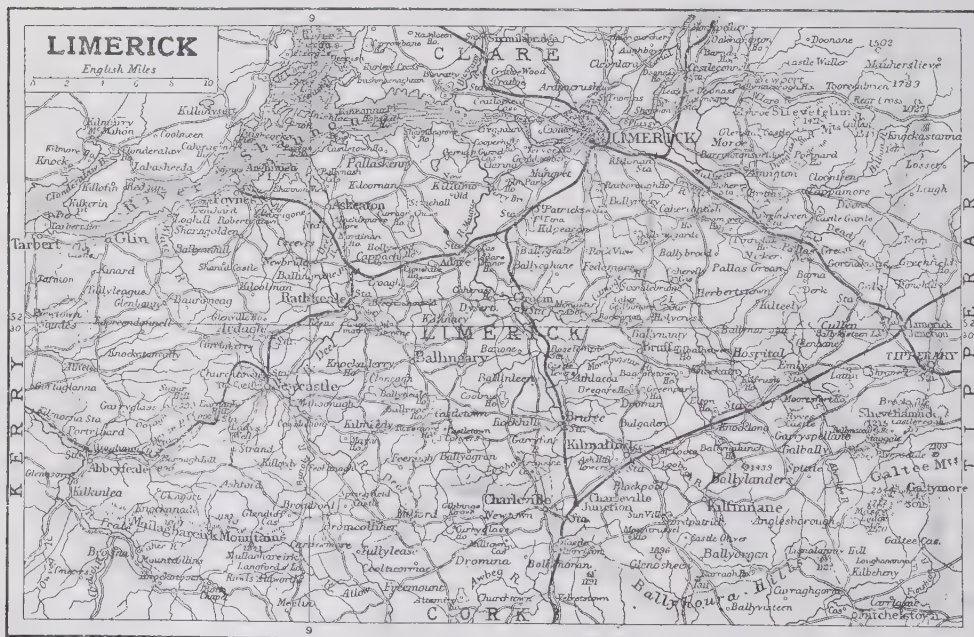
Lime-light Apparatus for general illuminating purposes.

of flame. Suitable flames are those produced by burning hydrogen, coal gas, ether, benzoline, or alcohol with oxygen, the latter of which, as well as hydrogen, and frequently coal gas, is

ditions—a quantity that would serve a lime light for about three hours. As the nice adjustment of the quantity of gas issuing is troublesome when the pressure is so high, automatic regulators are usually attached, which reduce the pressure to one which is but little above that of the atmosphere. The light produced differs in name and effectiveness according to the method of application of the oxygen. Thus, in the 'oxygen' light an alcohol flame is urged, after the manner of a mouth-blowpipe, by a jet of oxygen; in the 'blow-through' jet the oxygen is delivered by the inner of two concentric tubes, coal gas or hydrogen being supplied by the outer, as in the gas blowpipe; whilst in the 'mixed jet' the hottest flame of all is produced by mixing the gases in a small chamber before they arrive at the nozzle, where they are burnt. The oxyhydrogen jet, though it pits holes in the lime quicker than the other flames, gives the brighter light, which also has the advantage, from an optical point of view, of being emitted from a smaller area. If ether or benzoline is used as a combustible, the oxygen stream

laden oxygen then plays the part of the hydrogen in the jet. If the flame used for a limelight be kept constantly directed at one portion of the lime, it is found that, the temperature remaining the same, the light rapidly falls off in intensity, and does not become constant till after half an hour. On account of this, and to prevent pitting, the lime is rotated and slightly raised by a bevel wheel and screw every few minutes, so that a fresh surface is continually being exposed.

Limerick. (1.) County, prov. of Munster, Ireland, s. of the Shannon. Much of the surface is comparatively level, but in the w. it is hilly, and on the s. border are Mullaghareirk Mts., Ballyhaura Hills, and Galty Mts.; in the n.e. are Slieve Felim Mts.; and in the centre, Ballingarry Hills. The soil is in general fertile, especially in the district of the Golden Vale, stretching from about the mouth of the Maigue into Tipperary. Agriculture and dairy-farming are important. The county comprises fourteen baronies, and returns two members to Parliament. Co. tn. is Limerick. Area, 1,062 sq. m. Pop. (1901) 146,098. (2.) Municipal and parl. bor. and



Bartholomew Eds.

compressed for use in cylinders of mild steel. Under a pressure of 120 atmospheres, a cylinder 1 ft. 7 in. long, weighing 18 lbs., will hold 12 cub. ft. of oxygen measured under ordinary con-

ditions from the cylinder is divided—a portion passing through a 'saturator,' a chamber stuffed with a material soaked in the volatile liquid, with the vapour of which it becomes charged. The vapour

city, cap. of above co., on the Shannon, 77 m. n.w. of Waterford. The city comprises three parts—Irish Town, English Town, and Newtown Perry, the last being the modern and fashionable quarter.

The principal buildings are the cathedral of St. Mary, a Gothic edifice founded in the 12th century; St. Mainchin's; and the castle built by King John, a fine example of Norman architecture. The 'treaty stone' is preserved on a pedestal beside Thomond Bridge. Bacon-curing, flour-milling, and the manufacture of army and police clothing are the principal industries. Pop. (1901, parl. bor.) 46,170. See Lenihan's *Limerick: Its History and Antiquities* (1884).

Limestone. Limestones consist essentially of calcium carbonate, but are rarely altogether pure. They frequently contain silica, as quartz, flint, or chert;

isms. Among the crystalline limestones the most important is marble. Stalactite, stalagmite, and calc-sinter are also crystalline. Organic limestones may be classified according to the predominant fossils, as crinoidal limestone, coral limestone, shelly limestone, cephalopod limestone, nummulitic limestone, chalk (foraminiferal). Many oolites are of organic origin; others may have been deposited from solution. Limestones are readily soluble in waters containing carbon dioxide; hence in limestone districts the water circulating underground eats out caves and tunnels, and swallow holes and dolinas mark the surface. For the same reason

grant yellowish-green flowers, which are much sought after by bees on account of the large quantity of honey they contain. The wood of the lime tree is white and close-grained.

Lime Water, or **LIQUOR CALCIS**, is prepared by shaking up pure slaked lime in distilled water, and decanting. It contains half a grain of calcium oxide (CaO) in one fluid ounce. It is of service in rickets and other diseases of malnutrition. Externally lime water dissolves false membranes, and checks the discharges from inflammatory skin diseases and sores. Mixed with an equal quantity of olive oil, lime water forms Carron oil, which is



Thomond Bridge and King John's Castle, Limerick.

[Photo by Lavery, Dublin.]

carbonate or oxide of iron; carbon, and other organic matters, such as bitumen or asphalt. When there is an admixture of clay they pass into marls; many of them have a considerable percentage of magnesium carbonate, and are known as magnesian limestones; by increase of this impurity they become dolomites. All limestones are soft rocks, and when attacked by cold dilute mineral acids they dissolve readily, giving off carbon dioxide with effervescence. There are two structural varieties of limestone—the crystalline, composed entirely of more or less well-developed crystals of calcite; and the organic, which are made up of fragments of calcareous organ-

isms. Limestone weathers readily, especially when exposed to the smoky atmosphere of towns containing sulphuric and other acids. Limestones are much used in building—e.g. Bathstone, Portland stone—and in the preparation of lime and cement, and as a flux in iron foundries.

Lime Tree (*Tilia europæa*) is the linden tree of Germany. It is extensively planted in this country on account of its fairly rapid growth, and its tolerance of town atmosphere. It has a sturdy trunk, and slender, upright, close-growing branches. The leaves are large and heart-shaped, pointed at the apex, and with a downy under surface. The lime bears groups of very fra-

probably the best and most soothing application for burns.

Limfjord. See LIMFJORD.

Limitation, STATUTES OF. In England these statutes prescribe the periods after which a right of action is lost by lapse of time. By the Act of 1624 all actions on simple contracts, and for arrears of rent not on an indenture, and all actions for tort, with the exceptions hereafter mentioned, must be brought within six years of the origin of the cause of action; actions for injuries to the person, within four years; and actions for slander where special damage need not be proved, within two years. Merchants' accounts are included in the six years' period by the Mercantile

Law Amendment Act, 1856; and trustees, in the absence of fraud, are protected after six years by the Trustee Act, 1888. But if there is a written acknowledg-



Lime Tree (*Tilia europaea*).
1, Flower.

ment of the debt, or part payment of principal or interest by the debtor or his agent within the six years, the case is taken outside the statute, and the time runs from such acknowledgment or payment (Lord Tenterden's Act, 1829).

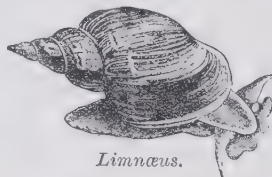
By the Real Property Limitation Act, 1833, actions by or against a deceased person for trespass on his estate, or by him, within six months of his death, may be prosecuted by his executors within a year, or against his executors within six months, of his death. All actions for rent on an indenture of demise, and for specialty debts, must be brought within twenty years; and all actions for copyhold fines and for arrears of rent-charges, within six years. By the Act of 1874, actions on a mortgage, or for a legacy, must be brought within twelve years of the last payment of principal or interest. By the rules of court execution must be levied within six years of a judgment. Actions for arrears of interest must be brought within six years. Actions for the recovery of land must generally be brought within twelve years of the commencement of the right, and the Act of 1874 makes elaborate rules for reckoning the period. In the case of land it is not only the right of action that is lost—i.e. the remedy—but the right itself is barred. Actions for the recovery of statutory penalties must

be brought within two years, and many statutory offences are similarly limited. See PRESCRIPTION, and Banning's *On the Limitations of Actions* (1877).

Limitation of Estates. In English law real property cannot be made the subject of absolute ownership, but only of estates of varying duration or quantum. The words used in any instrument to denote the quantum or duration of the estate granted are called words of limitation. Thus a grant of land 'to A B and his heirs' conveys an estate in fee simple, which is the largest estate known to the law, while a grant 'to A B and the heirs of his body' conveys an estate tail, and a grant 'to A B' merely conveys an estate for life.

Limited Liability. See COMPANY.

Limnaeus, a genus of gastropod molluscs to which belong some very common pond snails. Like the garden snails and slugs they breathe air, the mantle chamber being converted into a 'lung'; but, unlike their terrestrial allies, they are adapted for life in water, rising to the surface to breathe only at intervals. The species of *Limnaeus* have elongated, spirally-coiled shells, which are of thin and horny texture. They are herbivorous in diet, and are commonly kept in fresh-water aquaria to keep down algal life. The largest form is *L. stagnalis*, to be found everywhere in ponds, ditches, and slow-running streams; but economically the most important is *L. truncatula*, which harbours one stage of the destructive liver-fluke.



Limnaeus.

Limnanthemum, a genus of aquatic plants, order Gentianaceæ, with cordate leaves and beautiful white or yellow flowers. The best known species are *L. indicum*, bearing yellow flowers with fringed margins; and *L. nymphaeoides*, a British perennial water plant, with similar flowers in late summer.

Limnanthes, a genus of hardy Californian annual plants, order Geraniaceæ. They have solitary regular flowers, usually white or pinkish in colour. The only species commonly cultivated is *L. Douglasii*, which has a prostrate habit, and bears yellowish-white, fragrant flowers throughout the summer.

Limnoria lignorum, or the GRIBBLE, a small (about one-sixth of an inch long) marine isopod crustacean which is very destructive to submerged wood—e.g. the supports of piers. It is very widely distributed. See ISOPODA.

Limoges (anc. *Lemovicum*), cap. dep. Haute Vienne, France, on r. bk. of Vienne, 51 m. N.E. of Périgueux. In the middle ages it was celebrated for its enamel-work. It is now the principal seat of the porcelain manufacture, employing over 6,000 hands. Other manufactures are cloths and druggets, nails, knives, gloves, and paper. The cathedral of St. Etienne dates from 1273. There are also remains of a Roman fountain and amphitheatre. Pop. (1901) 84,121.

Limon, or PORT LIMON, seapt., Costa Rica, Central America, an E. terminus of railway to Puntarenas, 72 m. E. of San José; has an excellent harbour. Exports coffee, tropical fruits, rubber, and dyewood. Pop. 4,000.

Limonia, a genus of tropical Asiatic shrubs, order Rutaceæ. The best known species is *L. acidissima*, an Indian shrub, very spiny, bearing racemes of white fragrant flowers, followed by red, globose berries. The pulp of these berries is occasionally used by the natives as a substitute for soap.

Limonite, the hydrated oxide of iron ($2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$), never occurs crystallized, but in fibrous, earthy, stalactitic, mammillary, porous, or concretionary masses, and often as pseudomorphs formed by weathering of other minerals such as pyrites or marcasite. Its colour is black or hair-brown, and the streak or fine powder is yellow, distinguishing it from hematite; sp. gr. 3.8, h.=5½. Impure limonite is found in moorland clay soils, and also in meadows and bogs in spongy nodules, and is hence known as bog iron ore. In fresh-water lakes it is often deposited as a brownish slime by the action of plants on the ferrous carbonate, and in Sweden and Norway this lake ore is periodically collected by raking the bottom of the shallow pools. Earthy limonite, or limonite mixed with clay, is known as yellow ochre. It is found in veins, especially in their oxidized upper parts; and where it can be obtained sufficiently pure, it is extensively used as an iron ore.

Limousin (anc. *Lemovices*), ancient prov. and gov. of France, now forming the department of Corrèze and part of Haute Vienne. Cap. Limoges. It passed to Henry II. of England as part of the dowry of Eleanor of Aquitaine (1152), but was restored to France in 1369.

Limoux, tn., dep. Aude, France, on Aude R., 15 m. s.w. of Carcassonne. It has trade in wine ('blanquette de Limoux'), corn, fodder, and cloth. Pop. (1901) 7,045.



Limpets.

Limpets are gasteropod molluscs, characterized by the simple cap-shaped shell, and by the nature of the radula or tooth-ribbon. The common limpet (*Patella vulgata*) is very plentiful between tide-marks. Limpets breed in spring, and the young are ciliated free-swimming larvæ, devoid of shells. The foot is an almost circular mass of muscle; around it is visible the mantle, lining the shell, and bearing a circlet of vascular folds which functionally replace the missing gills. The mouth is at the end of a short proboscis; within it lies the very long radula, by means of which the limpet rasps its food from the surface of the rocks. At either side of the mouth are the tentacles, bearing each an eye at its base. The limpet is used by fishermen as bait, and is sometimes eaten as food. Other smaller but very abundant forms are the tortoise-shell limpet (*Acmæa testudinalis*), and the transparent limpet (*Helcion pellucidum*).

Limpopo, INNAMPURA, or CROCODILE, riv. of S. Africa. Rising in the Magaliesberg, w. of Pretoria, and flowing N.W. to Marico Drift, it describes a winding course N.E. and E. between Rhodesia and the Transvaal. At the Limpvuba confluence it enters Portuguese E. Africa, through which it flows S.E., receiving the Olifants or Lipalule 120 m. from its mouth, and discharges, after a total course of about 1,500 m., into the Indian Ocean. The river is navigable for small craft for 200 m., but its mouth is obstructed by sandbars.

Limulus. See KING-CRAB.

Linacæ, an order of herbs and shrubs, marked by bearing regular, hermaphrodite flowers with persistent sepals and petals, which fall soon after expansion. They are herbaceous plants, with very tough fibrous stems and oily seeds, which render some mem-

bers of the order of economic importance. *Linum usitatissimum*, the flax plant, is the source of most of the linseed-oil and linen of commerce.

Linacre, or LYNAKER, THOMAS (c. 1460-1524), English physician and humanist, born at Canterbury; studied at Oxford, Bologna, and Padua. When he returned to England he was made court physician to Henry VII., and also served under Henry VIII. and Mary. In 1509 he gave up practice to become rector of Mersham and prebend of Wells, and in 1518 prebend of York. He translated the works of Galen into choice Latin, and was the first to teach Greek at Oxford, where Erasmus and Sir Thomas More were among his pupils. See *Life* by Johnson (1835).

Linares. (1.) City of prov. Jaen, Spain, 13½ m. from Jaen; is the centre of a great silver-lead mining district, which produces over 80,000 tons of silver and copper ore annually. Manufactures sheet lead, pipes, dynamite, and rope. Pop. (1900) 38,245. (2.) Province of Chile, bounded on the s. by Nuble, on the w. by Maule, on the n. by Talca, and on the e. by the Andes. Area, 3,589 sq. m. Industries, stock-raising and viticulture. Cap. Linares. Pop. (1895) 101,859.



Linaria vulgaris.

1, Section of flower.

Linaria, a genus of hardy plants belonging to the order Scrophulariaceæ. Their flowers are characterized by a personate corolla with a bearded palate which does not close the mouth, spurred at the base. There are

four stamens, two being longer than the others. Among the British species are the yellow toad-flax, *L. vulgaris*; the sharp-pointed toad-flax, *L. elatine*; *L. cymbalaria*, the ivy-leaved toad-flax; and *L. spuria*, a less common annual. Among the garden species are the annual *L. spartea*, which bears deep yellow flowers; *L. reticulata*, yellow and purple; *L. purpurea*, purple; and the beautiful little perennial *L. alpina*, bearing yellow and blue flowers.

Linás or Lynas Point, headland in N. of Anglesey, North Wales, with a lighthouse visible 16 m. Signalling station for Liverpool vessels.

Lincei, ACCADEMIA DEI. See ACADEMY.

Lincluden, ruined abbey, Dumfriesshire, 1½ m. n.w. of Dumfries; originally a Benedictine convent, founded in the 12th century.

Lincoln. (1.) Municipal, county, and parl. bor. and city, cap. of Lincolnshire, England, on the Witham. The special industry is the manufacture of agricultural implements; there are also important horse and cattle fairs, and race meetings held annually. Lincoln Cathedral is a noble pile, doubly cruciform, with central tower (271 ft.) and two western towers. The castle was erected by William the Conqueror; the principal remains are the gateway and two towers. Other buildings of special interest are the Stone Bow, a 15th-century town gate, the High Bridge with houses thereon, the site of John of Gaunt's Palace, St. Mary's Conduit (16th century), and the Jews' House (12th century). Lincoln was an important Roman station and a colony, *Lindum colonia*, established on the site of a British stronghold. Battles were fought here in 1141 and 1217. Pop. of bor. (1901) 48,784. See Venables's *A Walk through Lincoln* (1883); Kendrick's *The Cathedral of Lincoln* (1893); Freeman and Farren's *Cathedral Cities* (1899). (2.) City, Illinois, U.S.A., the co. seat of Logan co., in the central part of the state. It stands amidst extensive coal deposits. Pop. (1900) 8,962. (3.) Capital of Nebraska, U.S.A., the co. seat of Lancaster co., and the second city in size in the state; is situated 65 m. s.w. of Omaha. It is an important railway centre, and has large stockyards and meat-packing establishments. The University of Nebraska is situated here. Pop. (1900) 40,169. (4.) Township, Providence co., Rhode I., U.S.A., 6 m. n. of Providence. Manufactures cotton. Pop. 11,565. (5.) Mountain (14,296 ft.), New Hampshire, U.S.A., in the White Mts., 67 m. n.w. of Concord.

Lincoln, ABRAHAM (1809-65), sixteenth president of the United States, and one of the greatest of Americans, was born in Hardin co., Kentucky. Lincoln was brought up on his father's farm in Ohio, and till the age of nineteen was engaged in farm work. In 1828 he made a voyage to New Orleans, and there for the first time was brought into contact with slavery as it really was,

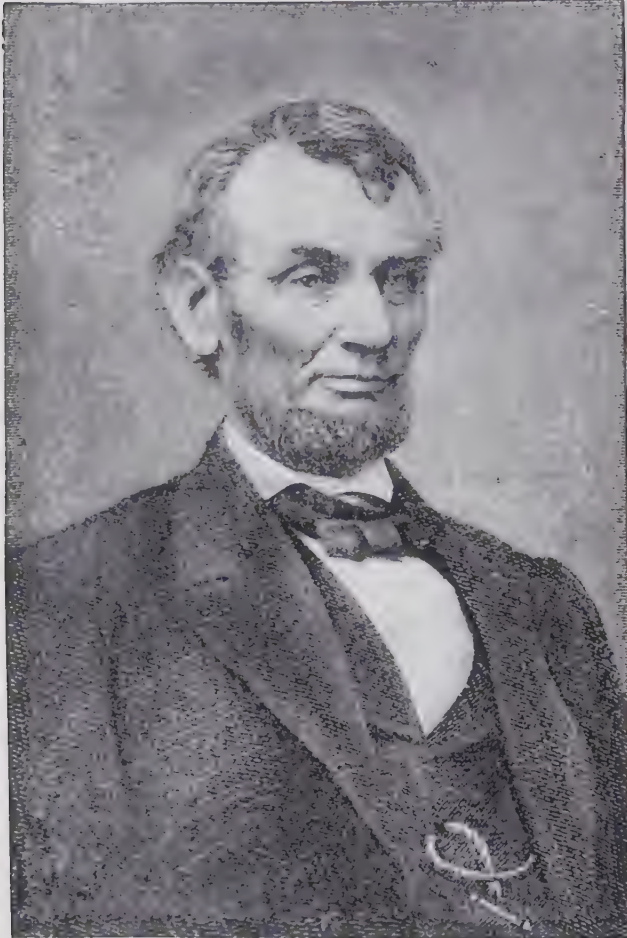
felt among the Whigs, whose local leader he became. In 1842 he declined further nomination, and retired to the practice of his profession. For the time his political instincts slumbered, but they had a rude awakening when the Missouri Compromise was upset in 1854 by Douglas's Kansas-Nebraska bill, reopening the whole question of slavery. In 1860, Lincoln, now a man of national rep-

and formed the Confederate States (1861). Lincoln delivered his inaugural address, and made the final appeal for the union, denying absolutely the right of secession. The Confederates fired on Fort Sumter, and the civil war began. On New Year's Day, 1863, Lincoln issued the proclamation freeing all slaves in the rebel states; and a year later another proclamation made all slaves in the union free. During this war period Lincoln was the embodied spirit of the nation. It was his genius that averted foreign complications and international recognition of the Confederate States; and it was his enthusiasm that kept the nation keyed to the great effort. In 1864 he was again elected president, and his second inaugural address is perhaps one of the greatest orations the world has heard. With that speech his work was done. He entered Richmond, which had fallen before Grant, and on his return to Washington he met his martyr's death at the hands of Wilkes Booth the actor, in Ford's Theatre. See Nicolay and Hay's *Abraham Lincoln: a History* (1899), and *The Cambridge Modern History* (vol. viii.).

Lincoln, BENJAMIN (1733-1810), American general, born at Hingham, Massachusetts; was a comrade of Washington in his earlier campaigns, and commanded the expedition which cleared Boston harbour of British vessels (1776). He unsuccessfully besieged Savannah (1779), surrendered Charleston to the British (1787), suppressed Shays's rebellion (1787), and was Secretary of War (1781-4).

Lincoln, HUGH OF. See HUGH OF LINCOLN.

Lincoln Judgment, THE, a celebrated ritual case of 1889. Dr. King, bishop of Lincoln, was cited before the Archbishop of Canterbury for alleged ritual offences at the administration of the holy communion, said to have been committed in the church of St. Peter-at-Gowts on Dec. 4, 1887, and in Lincoln Cathedral on Dec. 10, 1887. On Feb. 12, 1889, Dr. Benson, the Archbishop of Canterbury, heard the case in Lambeth Palace Library. There were eight alleged offences:—(1.) That water had been mixed with the wine. (2.) That the chalice so mixed was administered to communicants. The decision on these was that ceremonial mixing would be illegal, but that to mix water with the wine before the service was in accordance with primitive practice, and not forbidden in the Church of England. (3.) Ceremonial washing of the vessels after communion, and the drinking of the water used in ablution.



Abraham Lincoln.

which made a lasting impression on him. After a varied experience as a clerk, militia captain, storekeeper, and postmaster (to which office his growing political influence caused him to be appointed), he took up politics, and, with that career in prospect, he studied law, and was duly admitted. Elected to the legislature in 1834, he easily made himself

known, delivered his famous speech against slavery at the Cooper Union in New York, and as a result secured the republican nomination for the presidency, to which he was triumphantly returned. But his election was, if not the cause, at least the occasion of the breaking out of civil discord. South Carolina and the six Gulf states seceded

tion. This was pronounced legal. (4.) The adoption of the eastward position at the altar. This was judged to be no offence. (5.) That the manual acts were not visibly performed. It was decided that all such acts must be done before the people. (6.) That two candles were lighted on the super-altar. It was ruled that such were permissible. (7.) That the Agnus Dei was sung. This was permitted. (8.) That the sign of the cross had been made in the air at the benediction. This was declared illegal. The promoters appealed from this judgment to the judicial committee, and their appeal was heard in June and July 1891. The appeal, however, failed at all points, and the judgment still stands.

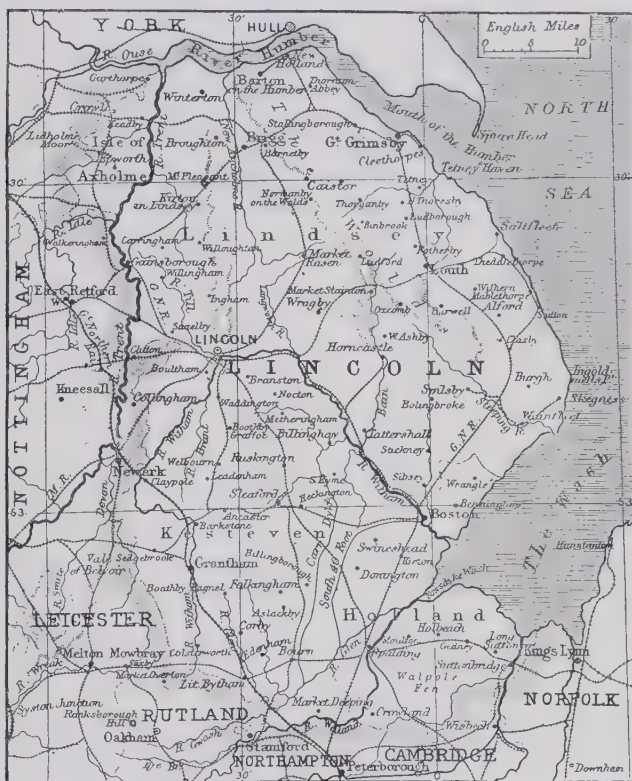
Lincolnshire, maritime co. in the E. of England, between the Humber and the Wash. The surface is in great part flat and low, especially in the E. and S., belonging to the Fen district, now reclaimed. Through the centre and north-east stretch the Wolds, ranges of low cretaceous hills; more to the W. the Cliff range traverses the country N. and S., with steep western face S. of Lincoln. The coast is bordered by sand-dunes. Principal rivers are Trent in N.E., Ancholme in N., Witham in centre, and Welland in S., and these are connected by a network of canals and dykes, some of the latter being also navigable (Carr, Fosse, etc.). The soil is fertile and highly cultivated, the coast-lands being enriched by 'warping,' or the deposit of sediment by the tide. Cereals form the leading crops; large numbers of turkeys, sheep, cattle, and horses are reared; and iron ore, building-stone, gypsum, limestone, and brick-clay are worked. The county returns seven members to Parliament. Ancient remains include many traces of Roman occupation—camps, castles, abbeys, and numerous interesting churches. Area (ancient co.), 2,646 sq. m. Pop. (1901) 498,847. See Allen's *History of the County of Lincoln* (1834); Wheeler's *History of the Fens of South Lincolnshire* (1897); and Venables and Perry's *Lincoln* ('Diocesan Histories,' 1897).

Lincoln's Inn. See INNS OF COURT.

Lincrusta, a substance used in ornamental plastic material, invented by James Walton. Composed of cellulose paper and pulverized cork, it is compressed, soaked with oil and resin, and while in a semi-viscous state is stamped with dies to give an impression in low relief. It is non-absorbent, very elastic and flexible, and resembles costly woods and prepared leather.

Lind, JOHANNA MARIA (1820-87), known as Jenny Lind, soprano vocalist, born at Stockholm, Sweden, where she received her first lessons in singing from Berg and others in the Court Theatre. She made her debut in her native town (1838), and subsequently studied with Manuel Garcia in Paris. In 1844 the influence of Meyerbeer secured her an operatic engagement in Berlin, and from this time onwards her success was assured. Her first appearance in London (1847) created scenes of extraordinary enthusiasm. She

Lindau, anc. tn., Swabia, Bavaria, on a small island (connected with the mainland by a railway embankment and wooden bridge) at N.E. extremity of Lake Constance, 25 m. S.E. of Constance; has a very good harbour, with two lighthouses. Its fisheries are important, and there is considerable trade in agricultural and dairy products, wood, and iron. It is said to occupy the site of *Castum Tiberii*. A free imperial city in 1275, it passed into the hands of Bavaria in 1806. The Rathaus—a fine specimen of re-



Lincolnshire.

retired from the operatic stage in 1849, and was afterwards heard only on the concert platform. While on tour in America (1852) she married Otto Goldschmidt, her accompanist. Jenny Lind possessed a voice of rare brilliance and sympathetic quality, with a compass of from D to D in alt, and her executive powers were of the highest order. She practically retired in 1870, but was a professor of singing in the Royal College of Music, London (1883-6). See Memoir by Holland and Rockstro (1891).

naissance architecture (1422-36)—and the Roman tower are interesting. Pop. (1900) 5,853.

Lindau, PAUL (1839), German dramatist, novelist, and critic, was born in Magdeburg, and, after a journalistic training in Paris, became editor of the *Düsseldorfer Zeitung* (1863). In 1872 he founded *Die Gegenwart*, which he edited till 1881, and in 1877 founded *Nord und Süd*. Merit-time he had published two books of travel, *Aus Venedig* (1864) and *Aus Paris* (1865), and had become known as a critic, his most

noteworthy productions being *Harmlose Briefe eines Deutschen Kleinstädters* (1870), *Literarische Rücksichtslosigkeiten* (1871), *Molière* (1872), and *Alfred de Musset* (1877). Of his novels, the best are *Herr und Frau Bower* (1882) and *Vater Adrien und andere Geschichten* (1893). His dramatic works, somewhat lacking in originality and force, have been collected under the title *Theater* (1873-88). Other works are *Aus dem Orient* (1889) and *Altes und Neues aus der Neuen Welt* (1893).

Lindau, RUDOLF (1829), German author, brother of the preceding, was born in Gardelegen. He has been a frequent contributor to the *Revue des Deux Mondes*, *Le Figaro*, and the *Journal des Débats*. His works—some of which are written in German, some in French, and some in English—show a wide knowledge of men and manners. They include *Un Voyage Autour du Japon* (1864); *The Philosopher's Pendulum* (1883); *Türkische Geschichten* (1891); *Der Farnar und Mayfair* (1898); and *Zwei Reisen in der Türkei* (1899).

Lindeblad, OSKAR (1800-48), Swedish author, studied at Lund, where he greatly distinguished himself by his poetic writings. His verses are remarkable for warmth, lucidity, and artistic excellence.

Linden, tn., prov. Hanover, Prussia, 6 m. w. of Hanover. Manufactures include machinery, velvets, woollen goods, carpets, chemicals, sugar, rubber, and artificial manures. Pop. (1900) 50,423.

Linden Tree. See LIME TREE.

Lindisfarne. See HOLY ISLAND.

Lindley, JOHN (1799-1865), English botanist, born and educated at Catton, near Norwich. He devoted himself to botanical studies, translated Richard's *Analyse du Fruit*, and wrote *Monographia Rosarum* (1820), illustrated with drawings by himself. Migrating to London, he became professor of botany in University College (1829), and lecturer in botany to the Apothecaries Company in 1836. His chief works are *Introduction to the Natural System of Botany* (1830); *The Vegetable Kingdom* (1846); and, in conjunction with Hutton, *The Fossil Flora of Great Britain* (1831-7).

Lindley, NATHANIEL, BARON LINDLEY (1828), English jurist, born at Acton Green, son of the preceding; was called to the bar (1850), and made a judge (1872). In 1875 he was knighted, and appointed judge to the Court of Common Pleas. He became a member of the Privy Council (1881), and master of the rolls

(1897-1900). Lindley has written several valuable works on law, including *Introduction to the Study of Jurisprudence* (1855), *A Treatise on the Law of Partnership* (7th ed. 1905), and *The Law of Companies* (6th ed. 1902).

Lindley, WILLIAM (1808-1900), English civil engineer, born in London; learnt engineering under Francis Giles, and was appointed chief engineer to the Hamburg and Bergedorf railway (1838). He designed the Hamburg water-works on a system now usually adopted on the Continent; constructed the sewerage works; reclaimed the 'Hammerbrook' district; and planned the rebuilding of the city after the fire of 1842.

Lindleya, a genus of Mexican evergreen trees, order Rosaceæ. There is only one species, *L. Mespiloides*. It grows to a height of about twenty feet, and bears solitary white fragrant flowers in summer. The flowers are followed by capsular fruits.

Lindo, MARK PRAGER (1819-79), Dutch prose writer, born in London; went to Holland at nineteen. He translated the works of Dickens, Thackeray, Fielding, and Scott into Dutch, and wrote many humorous and original sketches of Dutch life, such as *Familie van Ons* and *Afdrukken van Indrukken*. He founded the *Nederlandsche Spectator* (1856), in which much of his best work appeared.

Lindsay, co. seat and port of Victoria, Ontario, Canada, on Scugog R., 60 m. N.E. of Toronto. Trade in grain, lumber, and flour. Manufactures iron, machinery, leather, and beer. Pop. (1901) 7,003.

Lindsay, LORD OF THE BYRES. See CRAWFORD AND BALCARRES.

Lindsay, or LYNDsay, SIR DAVID (1490-1555), Scottish poet, and Lyon King of Arms, was the son of David Lyndsay of the Mount, Fifeshire, and of Garmylton, Haddington. He was a member of the royal household by November 1511; and on the birth of the young prince, afterwards James V., April 10, 1512, he was appointed keeper of his person. When the government was usurped by Angus in 1526, Lindsay and also the king's tutors, Gavin Dunbar and John Bellen-den, were dismissed; but after the escape of James from the Angus domination, Lindsay was appointed Lyon King of Arms (1529). He compiled a *Register of Scottish Arms* (1542), now in the Advocates' Library, Edinburgh, published in 1822, and republished in 1878. Nearly all the poetry of Lindsay has a social or political aim. He seeks to attain his purpose mainly by satire, and often by satire that is broadly indecorous. His verse

has no strictly poetic qualities, and perhaps its highest intellectual merit is its shrewdness. But if his portraiture of character is lacking in depth and individuality, his political and social judgments are thoroughly sane; and he scourges the vices and corruptions of his time with admirable discernment, and keen if rather coarse humour. His more important poems are *The Dreame*, an allegorical medley, with a very manifest political and social moral; *The Complaynt of the Papyngo*, in which the greed of the ecclesiastics is specially satirized; and the remarkable drama, *Ane Satyre of the Three Estaitis*, an interesting link between the old 'morality play' and later drama, and, apart from its literary merits—which, especially as regards wit, are considerable—one of the most valuable historic documents of the 16th century, on account both of its direct and indirect portraiture of the social manners of the time. The modern editions of Lindsay's poems are those of Chalmers (1806), the English Text Society (1865-71), and Laing (1879).

Lindsay, DAVID (1856), Australian explorer, was in the S. Australian survey department from 1873 to 1882, and leader of the Arnheim's Land Exploring Expedition, which discovered and mapped a great extent of country in spite of terrible hardships. In 1885 he conducted a private expedition, in which he surveyed 550 m. of boundary lines, and discovered the 'Rubies' in the MacDonnell Ranges.

Lindsay, JAMES BOWMAN (1799-1862), Scottish scientist, born at Carmyle, Forfarshire. Although in humble circumstances, he devoted himself to science, and discovered the heating and lighting possibilities of electricity as early as 1834, and lit his garret in Dundee with electric light. He was also a pioneer of wireless telegraphy, and transmitted messages by this means across the Firth of Tay. His merits received little recognition until after his death.

Lindsay, ROBERT OF PITSCOTTIE (?1532-?1578) Scottish chronicler, son of William Lindsay of Pyotstoun, near Pitcottie, Fifeshire. Little is known of his life except that he became tenant of the farm of Pitcottie, then possessed by Sir William Scott of Balwearie. His *Chronicle* is avowedly a continuation of Hector Boece's Latin *History of Scotland*, translated by John Bellenden, and extends to 1575, there being also a continuation, by another writer, to 1605. Its chronology is vague and often misplaced, and there are many

errors; but the narrative abounds in picturesque detail, much of it probably borrowed from the old ballads. Lindsay's narrative was first published by Robert Fairbairn (1728); an edition by Graham Dalryell appeared (1814); and an edition founded on all the available MSS. has been published by the Scottish Text Society.

Lindsaya, a genus of tropical ferns, many of which are cultivated as stove plants in this country. Among the most beautiful of the species are *L. Guianensis*; *L. cultrata*, very fragrant; *L. adiantoides*; *L. reniformis*; and *L. stricta*.

Lindsays, EARLS OF CRAWFORD AND BALCARRES. See CRAWFORD.

Lindsey, PARTS OF, and LINDSEY N., S., E., and W. (parl. div.). See LINCOLNSHIRE.

Linea, or LA LINEA, tn. of S. Spain, in the prov. of Cadiz, between Gibraltar and San Roque, and within the Spanish lines—hence the name; supplies Gibraltar with vegetables and fruit. Pop. (1900) 27,743.

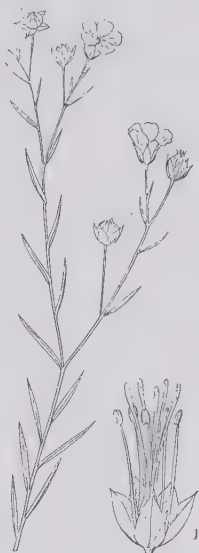
Linear Measure. See WEIGHTS AND MEASURES.

Linen, a fabric spun and woven from the fibres of flax (*Linum usitatissimum*), a plant of the order Linacea, which grows from two to three feet in height. It is widely grown in Europe, Asia, and America. The art of spinning and weaving flax into linen is very ancient. Linen is mentioned in the Bible, and has been found as mummy-cloths in Egypt. Linen is manufactured in France, Belgium, and Germany. Courtrai in Belgium and Westphalia in Germany produce fine linen yarn, used in the making of costly laces; and in the United Kingdom Belfast is the most important town engaged in the manufacture of fine linen fabrics. Heavy fabrics, such as sail-cloth and canvas, are made at Dundee and Arbroath in Scotland; diaper-towelling and linen fabrics of medium weight at Dunfermline, and other places in Fife, and at Barnsley in Yorkshire. The first mill for spinning yarn by machinery was built at Darlington in 1787. In 1790 mills were erected in Scotland, the first near Glamis. But though Cartwright's loom was applied to the weaving of cotton in 1785, the first successful factory for weaving linen by power-looms was not erected till 1812. The total annual value of linen manufactures exported from the United Kingdom is about £6,000,000 yearly. Of late years the manufacture has shown signs of decline through competition with jute for heavy goods, and with cotton for finer fabrics. Damask at the present time is often woven

of cotton and linen together. In Ireland very artistic coloured linens are being produced for use as dress materials and in upholstery and embroidery.

Process of Manufacture.—The stems of the flax plants, after being pulled up by the roots, are converted into a textile fabric by the processes of 'rippling,' 'retting' or 'steeping,' 'grassing,' 'breaking,' and 'scutching.' *Rippling* is the process of separating the seeds from the plant by means of 'beaters,' which loosen the seeds, and 'shakers,' which shake them out from the flax straw. *Retting* is the process of getting rid of the resinous matters present in the plant. This is done by steeping the flax stems in water and subjecting them to fermentation. Soft water is es-

handful or 'strick' of the flax and draws it several times through the teeth; then he turns the strick and heckles the opposite end in the same way. This process of heckling is now usually accomplished by machines, constructed of vertical sheets of leather, to which are fixed a number of heckle stocks in such a manner that their heckle-pins intersect when the heckling takes place. The flax hangs down between the sheets, which are moved downwards by suitable driving-gear. After the heckling is completed, the flax 'line' is prepared for spinning by various machines. (1.) The spreading-frame. On this the flax is formed into a continuous ribbon called 'sliver.' (2.) The drawing-frame. On this the 'sliver' is doubled and drawn out by rollers through travelling gills with steel teeth. There are often four drawing-frames, each successive frame with finer gill teeth than the one before; and from eight to fifteen 'slivers,' delivered by one machine, are drawn out into one 'sliver' by the next. The object of this doubling and drawing is to produce a 'sliver' of uniform size throughout and with all fibres parallel. (3.) The roving-frame. Through this the attenuated fibre is passed singly, and the frame is provided with a flyer which slightly twists the 'sliver' and a bobbin on which it is wound. The 'rove' or 'rovings' are now spun into yarn on the 'throstle' machine, invented by Arkwright, in the same manner as cotton, excepting that in spinning flax fibre the fine yarn must be spun wet, at a temperature of 120° F. Coarse and heavy yarns may be spun dry. In weaving, hand-looms are still employed for fine linens to some extent, but, generally speaking, the work is done by power-loom. In 'tow' spinning the fibre is carded like jute on carding engines, each of which has a peculiar arrangement of revolving cylinders armed with pins of steel wire. It is then like the 'line' placed in the drawing-frames. After the weaving process the linen has to be bleached. The primitive way of bleaching it was to expose it on grass or lawns to the action of air, light, and moisture. This was called 'crofting,' and the term 'lawn' is still applied to the finer kind of linen. The modern process of bleaching fabrics of vegetable fibre dates from 1785. The cloth is first singed by being rapidly passed over a red-hot iron cylinder, which removes the minute particles of fibre and leaves the cloth smooth. It is then boiled with lime water in the 'bucking kier.' The chemical action of the boiling lye on the cloth forms a soap with the



Flax Plant (*Linum angustifolium*).

1. Flower (petals removed).

sential. *Grassing* is the drying of the flax stems. They are then passed between horizontal fluted rollers, which break up the woody portion of the stems and render it easy afterwards by means of *scutching* to separate the brittle, woody part of the stem from the fibrous portion. The latter is now made up into bundles and sent to the mill to be spun into yarn. The flax is then roughly sorted and 'heckled.' The 'heckling' process separates the long and best portion, called 'line,' from the short and ravelled portion, called 'tow.' A hand-heckle is an oblong stock of wood, with strong steel teeth about 7 in. long. The heckler takes a

FIRST BRUISING WITH "MAIL"
USED IN FLANDERS
3 FRANCE

SCUTCH-BLADE

PREPARATION OF FLAX BY HAND

SCUTCHING

SEPARATING WOBBY MATTER
FROM FIBRE
A LEATHER BAND FOR
REGGUNG OF BLADE

HAND HECKLING

BREAKING UP FIBRE
BETWEEN FLUTED ROLLERS

SCUTCHING MACHINE

A REVOLVING CYLINDER B BEATERS ATTACHED
TO DASH FLAX AGAINST GRATING C
D. A TOOTHED BEATER

HECKLING MACHINE

A FLAX HOLDERS
CARRIED IN TROUGH B.
RAISED DURING
COMBING AS AT C
D LEVER CARRIES
HOLDERS & FLAX TO
FINER HECKLES
HAND
E HECKLES ON LEATHER
F. G ADDS DROP DOWN TO CLEAR
HECKLES

LONG-LINE SPREADING FRAME
A TRAVELLING GILLS TAKING FLAX
FROM RECEIVING ROLLERS B
D ROLLER DRAWING OUT FLAX E PLATE TO
DOUBLE SLIVER F DELIVERY ROLLERS TO CAN G

DRAWING FRAME

WET SPINNING FRAME
A BODDINS OF ROVE
B HOT WATER TROUGH
C DRAWING ROLLERS
D SPINDLE & BODDIN
E BODDIN LIFTER

SCREW-GILL REGULATING
ROVING FRAME
A "SLIVER" FURTHER DRAWN &
TWISTED ON BODDINS B

resinous and fatty substances in the linen. This is removed by washing. The cloth is then 'chemiched' or scoured in sulphuric acid, exposed to the atmosphere, and again scoured; then boiled in soda-lye and dried over heated tin rollers, or suspended in the air. The linen is rendered glossy by being first mangled, then starched, dried, and calendered. Much open-air bleaching, combined with the chemical treatment, is still carried on near Perth. See Wilson's *Flax and its Manufacture* (1888); Charley's *Flax and Linen* (2nd ed. 1877); Leggatt's *Theory and Practice of the Art of Weaving Linen* (1893).

Lines of Force. See MAGNETISM, CONDENSER, ELECTROSTATICS, and other electric articles.

Ling. See CALLUNA.

Ling (*Molva molva*), a member of the cod family, is found from Spitzbergen to the Strait of Gibraltar, and on the other side of the Atlantic to Newfoundland. It is common in the deeper water in the northern part of the North Sea, at the Faroes, and on the west coast. The ling spawns from April to June, and is the most fecund fish known, a large female producing from fifty to sixty million eggs, which are buoyant or pelagic. The young undergo remarkable transformations in appearance. Ling feed almost entirely on other fish. They are caught chiefly by lines, but also by trawls, and form an important item in the fisheries.

Lingah, or BANDER LINGAH, seapt., prov. Laristan, Persia, on Persian Gulf, 100 m. s.w. of Bender Abbas. Trade in pearls, rice, gold, and cotton stuffs. In 1904 the total exports were £250,000, of which £93,000 were British; and its imports £308,000 of which £194,000 were British. The Arabs held the port until 1898. Pop. (1900) 15,000.

Linga Pujā. See PHALLYS.

Lingard, JOHN (1771-1851), English historian, born at Winchester, and educated at the Roman Catholic College of Douay, France. Returning to England, Lingard was ordained priest (1795); and later became vice-president of the Roman Catholic College at Crook Hall, and afterwards at Ushaw, Durham county. He retired to a private mission at Hornby in Lancashire (1811). His great work is the well-known *Hist. of England* (1819-30).

Lingayen, tn., cap. of prov. Pangasinan, Luzon, Philippines, 100 m. N.W. of Manila; important trade centre and favourite health resort. Pop. 19,000.

Lingen, tn., Hanover, Prussia, on Ems Canal, 43 m. N.W. of Münster. Iron foundries, ma-

chinery, and railway works. Pop. (1900) 7,048.

Linggi, or LINGEY, riv., British colony of Malacca, Malay Peninsula, of which it forms the W. boundary. It is navigable for vessels drawing from eight to ten feet of water for about five miles to the settlement of Sempang.

Lingua Franca, a corrupt form of Italian, spoken in commercial intercourse in the Mediterranean. The word means 'free tongue,' and denotes any language in general use, in conversational intercourse, between foreigners and natives, over a wide extent of country. It is not necessarily the tongue of the district. Similarly, Urdu is a *lingua franca* understood all over India; also the curious 'pidgin English,' which forms the medium of communication between the Chinese of the seaboard and foreigners.

Linguaglossa, tn., prov. Catania, Sicily, on N.E. slope of Mt. Etna, 24 m. N. of Catania. Pop. (1901) 13,121.

Lingula, a genus of brachiopods, represented by numerous fossil forms and by living species, of an interesting simplicity of form.

Lingula Flags, strata belonging to the Upper Cambrian formation, in some parts of Wales over five thousand feet thick. See CAMBRIAN.

Linievitch, NICOLAI PETROVITCH (1834), Russian general, comes of a well-known Polish Catholic family distinguished in border struggles against Turk and Tartar. He served in the Polish insurrection, the Russo-Turkish war, and the China expedition. After the disastrous battle at Mukden (March 7-10, 1905), where he commanded the Russian left against Kuroki, Linievitch was appointed commander-in-chief in succession to Kuropatkin. See RUSSO-JAPANESE WAR.

Liniments, or EMBROCATIONS, are employed to cause irritation on the skin, and so relieve inflammation existing beneath by drawing it to the surface. This may be accomplished by various agents, such as cantharides, mustard, ammonia, acetic acid, turpentine, capsicum, or camphor.

Linköping, cap. of the Swedish prov. of Östergötland, situated in a fertile plain near the Stanga, 29 m. W.S.W. of Norrköping; has a fine cathedral in the Roman style, built 1150-1499, and a castle (15th century). Manufactures tobacco, cloth, and hosiery. Pop. (1901) 14,653.

Links. See GOLF.

Linley, THOMAS (1732-95), English musical composer, born at Wells, Somerset. In 1775 Linley, with his son Thomas, composed

the music for *The Duenna* written by Sheridan, his son-in-law. The following year he purchased an interest in the Drury Lane Theatre, and became musical director there. Among his operatic compositions are *The Camp*, *The Carnival of Venice*, *Robinson Crusoe*, and *The Triumph of Mirth*. He also wrote a number of cantatas, madrigals, and songs.

Linlithgow, ancient royal and parl. burgh, and co. tn. of Linlithgowshire, Scotland, 16 m. W. of Edinburgh, near S. shore of Linlithgow Loch. On an eminence, bordered by the loch, is the ruin of Linlithgow Palace, which dates from the time of David I., but was largely rebuilt by James IV. and James V. It was the birthplace of James V. and of Mary, Queen of Scots. At Linlithgow the Regent Moray was shot by Hamilton of Bothwellhaugh in 1570. Industries, tanning and currying. Pop. (1901) 4,279.

Linlithgow, JOHN ADRIAN LOUIS HOPE, FIRST MARQUIS OF (1860), Scottish statesman, born at Hopetoun, near Edinburgh. As Earl of Hopetoun he filled several parliamentary and official positions, including that of governor of Victoria (1889). In 1901 he was appointed first governor-general of the Commonwealth of Australia, and was Secretary of State for Scotland during part of 1905. He was created a marquis of the United Kingdom (1902).

Linlithgowshire, or WEST LOTHIAN, midland co. of Scotland, bounded on the N. by the Firth of Forth, S.E. by Edinburghshire, S.W. by Lanarkshire, and N.W. by Stirlingshire. The surface is flat along the coast, and rises gradually towards the S., where it attains an average elevation of 700 ft. The principal rivers are the Almond and the Avon. The soil is fertile, except in the moorland and rocky parts in the S. and S.E. Area, 120 sq. m., of which 76 per cent. is under cultivation. Coal is largely mined at Bo'ness and Bathgate; oil-bearing shales in Bathgate, Whitburn, Linlithgow, Abercorn, Dalmeny, and Uphall parishes. Large paraffin works have been established at Dalmeny, Broxburn, Winchburgh, Uphall, Philipstoun, and Bathgate. Iron ore occurs in the parishes of Bo'ness, Abercorn, Torphichen, and Bathgate. There are blast-furnaces at Kinneil. Sandstone is quarried at Philipstoun, Winchburgh, and Bo'ness. The principal towns are Linlithgow (co. tn.), S. Queensferry, Bathgate, Bo'ness, and Armadale. Pop. (1901) 65,700.

Linnaea, a genus, order Caprifoliaceæ, with only one species, *L. borealis*, a trailing evergreen, shrubby plant, sometimes found

wild in Britain. It bears fragrant pendulous, campanulate, flesh-coloured flowers, and is a good rock plant, requiring shade, moisture, and peat.

Linnaeus (von Linné), CARL (1707-78), botanist and systematist, was born at Råshult in Sweden. He became a student of divinity, but his interest in botany early led him to abandon theology for medicine, which he studied at Lund. At the early age of twenty-three he took charge of Professor Rudbeck's botanical garden, and delivered botanical lectures. During this period he began the composition of some of his most important works, and after botanical journeys in Lapland and Dalecarlia he went in 1735 to Holland. Here were spent three fruitful years, marked alike by the publication of several important works—*Bibliotheca Botanica*,

was really done by Cæsalpino, Morison, Ray, Tournefort, and others. To him we owe the binary nomenclature of organisms and an artificial classification of plants. In addition to this artificial system, Linnaeus left behind him a fragment of a natural system which was of great value to later workers. In so far as scientist means investigator of causes he was not truly scientific, for his love of order was greater than his love of nature. But without such as he it may be doubted whether scientific progress would be possible. In two respects, however, Linnaeus's influence distinctly retarded progress. First, he lent the weight of his authority to the doctrine of the constancy of species, to which, indeed, he for the first time gave precise expression. Secondly, his own indifference to morphology,

Linnell, JOHN (1792-1882), English painter, was born in London. His first teachers were West and Varley; but he entered the Academy school when he was fourteen, and in 1807 he exhibited at the Academy. He is remembered for his landscapes, with their fine perspective and impressive sunset effects, and was also known as a portrait painter. See *Life by Story* (1892).



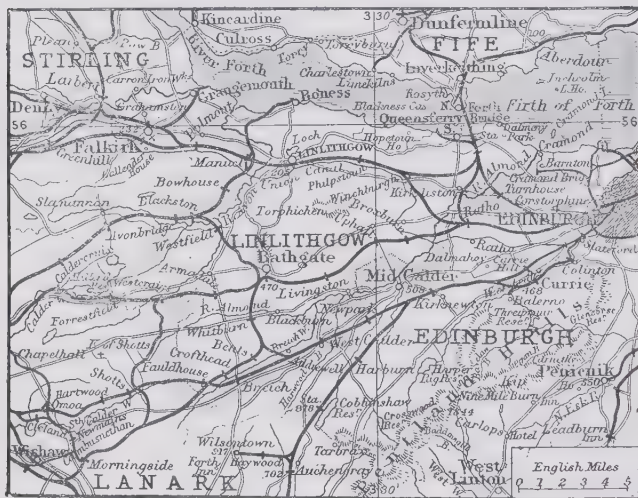
Linnet.

Linnet (*Linota cannabina*), a small song-bird of the finch family which is abundant in uncultivated regions throughout the British area, but is replaced in Scotland, in the higher regions at least, by the twite or mountain linnet. In the breeding plumage the male linnet has a crimson breast, and crimson tints on the forehead and crown. The wing and tail quills are black with white markings, the back chestnut brown, and under surface dull white. The female and young have no crimson about them, and have both upper and under surface streaked with dark brown. The food consists of oily seeds. Linnets have a naturally sweet song, and can also be taught the song of other species; hence they are favourite cage-birds.

Lincolns, CHARLES ALEXANDRE LÉON DURAND, COMTE DE (1761-1848), French admiral, who commanded the *Atalante* and fought the British *Swiftsure* (1794), but was captured. In 1801 he repulsed Saumarez in Algieras Bay, but was defeated by him a few days later.

Linoleic Acid, $C_{18}H_{32}O_2$, is an unsaturated acid present as a glycerol ester in 'drying' oils such as linseed and poppy oil. It is prepared from linseed oil by saponification with caustic soda, purification and decomposition of the soap with acid, and is a yellow oil which becomes oxidized to a tough varnish on exposure to the air.

Linoleum is the principal kind of floorcloth now employed, being more durable and a better non-conductor—i.e. 'warmer'—than the 'oilcloth' once largely used. It is prepared by coating strong canvas with five or more coats of thick linseed-oil paint, and printing the surface with coloured designs. Linoleum consists essentially of



Linlithgowshire.

Classes Plantarum (1738), *Genera Plantarum*, *Fundamenta Botanica* (1736), *Systema Naturæ*, etc.—and by visits to England and France. In 1738 he returned to his native country, and, after practising medicine in Stockholm, went in 1741 to Upsala as professor of botany. Here he remained till his death, publishing *Philosophia Botanica* (1751), and leaving behind him a curious treatise called *Nemesis Divina*.

Linnaeus's services to natural science, and especially to botany, were very great. Much of his work was the summing up and systematizing of the results of his predecessors' labours, and though he himself fully acknowledged his obligations in this respect, in popular belief he has been credited with much that

except as a means to an end, led him to regard it as the main business of the botanist to know as many plants as possible—a heresy from which botany is only now beginning to escape. See Sachs's *History of Botany* (1875; trans. 1889), and Carus's *Geschichte der Zoologie* (1872).

Linnean Society, a society of biologists founded in London, in 1788, by Sir J. E. Smith, who also purchased the books, MSS., and botanical collections of Linnaeus, and presented them to the society in 1828. The Linnean Society obtained a royal charter in 1802. Candidates for membership must be interested in botany or zoology. The entrance fee is £6, and the annual subscription £3. The society's rooms are at Burlington House, Piccadilly.

a mixture of cork dust and mineral colouring matters, ground with oxidized linseed oil to a stiff homogeneous paste, and put on a canvas backing. The linseed oil is oxidized by being first heated or 'boiled' at a temperature of 260° C., along with red lead or manganese salts, and is then in a hot condition caused to fall in the form of spray, meeting a current of air, by which means it becomes thoroughly oxidized and converted into a tough and elastic semi-solid mass. The oil is also treated by dipping sheets of cotton cloth into it, and hanging them up to dry, the operation being repeated until a layer of dried or oxidized oil of sufficient thickness is obtained. In either case the oxidized oil is ground up with the cork dust, boiled but not oxidized oil, wood flour, and various colouring matters. The mass is then spread by suitable machinery in a layer ranging from one-eighth to one-fourth of an inch thick on a stout canvas sheet, and the fabric hung in a warm and airy room to dry thoroughly. If a self-coloured lineoleum is required, the product may be used in this condition; but patterns of various kinds are generally either printed on the surface with oil colours, or made in such a way, of pieces of the coloured mixture, that the pattern goes right through the substance of the fabric. The latter is the best, as with surface-printed lineoleum the pattern wears away in a comparatively short time, while with the 'inlaid' lineoleums it is retained as long as any of the fabric remains. The best lineoleum is made at Kirkcaldy, Fifeshire, the chief centre of the industry.

Linotype. See TYPE-SETTING MACHINES.

Linsangs are small carnivores allied to the genets, and are remarkable for the beauty of their colouring. Their bodies are long and slender, the limbs short, the fur soft and short, and the tail often very long. The ground-colour of the fur is some shade of tawny, beautifully marked with black. The animals probably feed chiefly upon small birds, and perhaps also upon insects. The species of the genus *Prionodon* are confined to the Oriental region, and the largest is *P. maculosus* of Burma, in which the head and body measure from 18 to 20 in., and the tail under 17 in. In W. Africa occurs *Potana poënsis*, the African linsang, in which the head and body measure 38 in., and the tail rather more. The linsangs are docile animals, readily tamed.

Linseed is the seed of the common flax, *Linum usitatissimum*. The seeds are brown, have an oval shape with sharp edges,

and are chiefly valuable for the oil contained in the whitish interior. The outer part of the seed is mucilaginous, and an extract made with hot water is used as a demulcent ('linseed tea') in cases of cough and sore throat. The residue, from which the oil has been expressed, is ground as cattle food, and is often supplied for making poultices, although the crushed seed still containing the oil ('linseed meal') should be used for the latter purpose.

Linseed Oil is obtained by crushing and pressing the seeds of the flax ('cold-drawn oil'), a further quantity of an inferior quality being obtained under the action of heat. Good seeds contain up to 40 per cent. of oil; from 25 to 30 per cent. can be extracted by pressure. The principal ingredients in the oil are the glycerol esters of isolinolenic acid, $C_{15}H_{30}O_2$; its isomeric form, linolenic acid; linoleic acid, $C_{18}H_{34}O_2$; and small quantities of the fatty and oleic acids. The freshly-extracted cold-drawn oil is golden yellow, of sp. gr. about .935, and of slight odour or taste, the hot-pressed oil being far stronger in these latter respects. The chief value of linseed oil is in its drying properties—i.e. on exposure to air it becomes converted by oxidation into an elastic varnish-like solid, insoluble in most solvents. This property is greatly accentuated by heating the oil, 'boiled oil' being linseed oil that has been heated to from 130° to 200° C.; air, as a rule, being blown through the liquid, and metallic salts or 'driers' added to increase the rapidity of oxidation.

Linseed oil is largely used on this account, both in its raw and boiled state, as a vehicle in which to suspend pigments to make oil paints, and as a component of varnishes. The product of prolonged boiling is sticky, and is used for printing ink, whilst the elastic oxidation product of boiled oil is largely prepared as the binding material in the manufacture of lineoleum.

Linseed oil is also used in pharmacy—'carron oil,' a valuable remedy for burns, being a mixture of equal parts of raw linseed oil and lime water.

Lint was formerly prepared by scraping the surface of linen obtained from the inner woody portion of the stem of *Linum usitatissimum*, but is now manufactured on a large scale by machinery. Lint is the proper medium for applying ointments and lotions. When used with the latter, the wet lint should be covered with oiled silk to prevent evaporation. This is absolutely necessary where the skin is broken, as the lint would otherwise quickly dry and adhere to the wound.

Linton, ELIZA LYNN (1822-98), English novelist, born at Keswick. Her first novels were severely criticised, but her later works became very popular. The best are *The True History of Joshua Davidson* (1872), *Autobiography of Christopher Kirkland* (1885), and *The Atonement of Leam Dundas* (1877). Her papers on 'The Girl of the Period' in the *Saturday Review* (republished 1883) attracted much attention. See *My Literary Life* (1899).

Linton, SIR JAMES DRUMGOLE (1840), English painter who reorganized the Institute of Water-colour Painters under the name of the Royal Institute of Painters in Water Colours, and became its first president (1884). He considerably raised the status of water-colour painting in England. In 1885 he was knighted. His works in oil are mainly genre or historical, among the latter class being *The Marriage of the Duke of Albany*.

Linton, WILLIAM JAMES (1812-98), English wood-engraver and author, born in London. As an engraver his best work appeared in the *Illustrated London News*. In 1867 he removed to the United States, and settled at New Haven, Connecticut. An ardent Chart-ist, throughout life he zealously upheld republicanism and the rights of workmen. His principal publications include *Claribel and other Poems* (1865); *Some Practical Hints on Wood-engraving* (1879); *Life of Thomas Watson* (1879); *The Masters of Wood-engraving* (1890). He furnished the illustrations to his wife's (*Eliza Lynn Linton*) work on *The Lake Country* (1864). See his autobiographical *Memories* (1895).

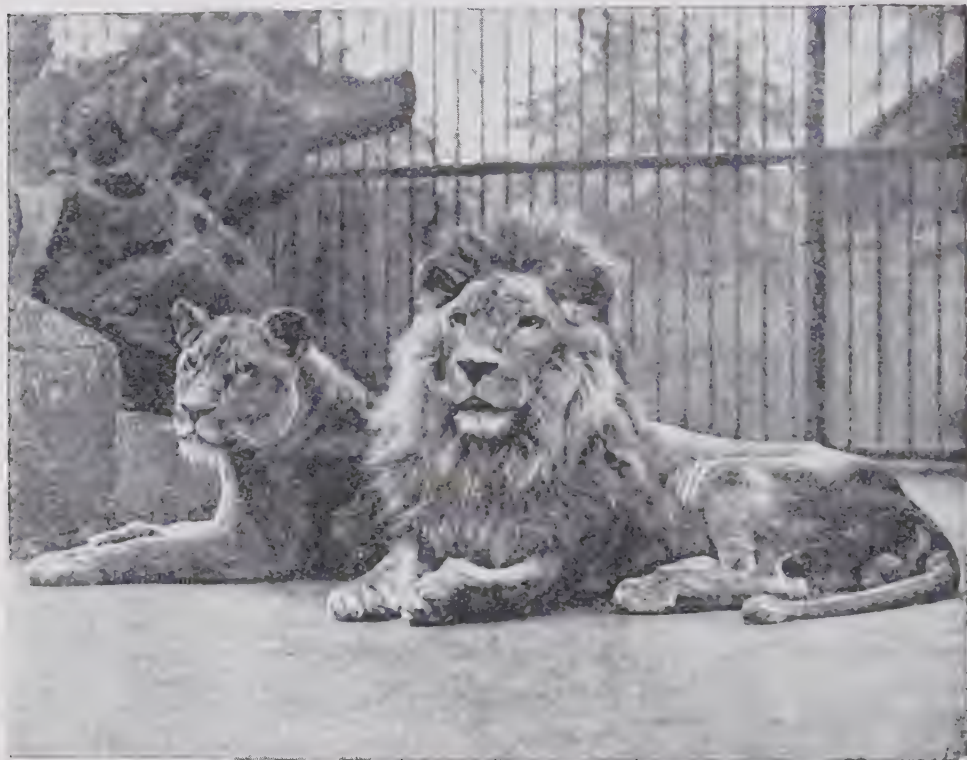
Linum, a genus of mostly hardy plants, order Linaceæ, distinguished by the flowers having five sepals, five petals, and a ten-valved capsule. Among the British species are *L. perenne* and *L. angustifolium*, two perennial plants with narrow, tapering leaves, slender, wiry stems, and fragile blue flowers in summer; and *L. catharticum*, an annual plant, common in dry meadow land, bearing oblong leaves and panicles of small white flowers in summer. Garden species include *L. Narbonneense*, blue, or sometimes white; *L. tauricum*, a small evergreen shrub bearing panicles of yellow flowers in late summer; *L. alpinum*, a small plant bearing large blue flowers in July; and *L. grandiflorum*, an African species with rose-coloured flowers. *L. usitatissimum*, the common flax of commerce, belongs to this genus. It is a hardy annual plant, bearing panicles of blue flowers in July. Linums are easy of cultivation in a well-drained, rather sandy soil.

Linus, in Greek legend, was the personification of a urge or lamentation. He was said to have been the son of Apollo by a muse; his mother exposed him after his birth; he was reared by some shepherds, but was afterwards torn in pieces by dogs. A Theban version of the story tells that Apollo slew Linus for venturing to compete with him in music. Apollodorus and Pausanias are the ancient authorities.

Linz, or **LINTZ** (Rom. *Lentia*), tn., Danube (r. bk.), port, and

mane, present in some, though not all adult males, and characteristic of the species. Another characteristic is the tuft of long hair at the extremity of the tail, in the middle of which is a curious horny appendage, called the 'thorn.' The colour is uniform and tawny, showing that the lion was originally a desert animal, but the young exhibit traces of the stripes so characteristic of most of the cat tribe. As in the other large cats of the Old World, the pupil of the eye is round. An

throughout this extensive range, although there is considerable variation in the length and colour of the mane. In habit the animals are purely nocturnal, and sleep during the day in reeds or among bushes. They never climb trees. They are sometimes found solitary, sometimes in pairs, and in some districts in small troops. Mating seems to be for life, and from two to six cubs are produced at birth—in captivity at least. They breed readily in captivity, and are then much



'Le Roi et la Reine.' Photo from life by Gambier Bolton, F.Z.S.

(By permission of the Autotype Co., London.)

episc. see of Austria, chief tn. of prov. Upper Austria, stands on r. bk. of the Danube, 117 m. w. of Vienna. Linz has iron, boat-building, cotton, brewing, tobacco, and leather industries, and manufactures carpets, cloths, and fezes. Pop. (1900) 58,778.

Lion (*Felis leo*). The lion, though believed by some authorities to be less powerful than the tiger, is certainly the handsomest and most imposing of the carnivora. Much of the impression of size and strength which the animal gives is due to the flowing

adult male reaches a length of about ten feet, while the females are a foot shorter. The mane of the male does not appear till the animal is about three years old.

The lion was formerly much more widely distributed than at present. It now occurs throughout the continent of Africa, though it has been exterminated in the more civilized regions; in Asia it extends from Mesopotamia and S. Persia to India, but is nearly exterminated in the last-named country. There is apparently only one species of lion

less fierce than tigers. The natural food of the lion appears to be ungulates, such as antelopes, zebras, buffaloes, giraffes, pigs, rhinoceros, and so on; but they will also eat carrion, and even small rodents, when old and decrepit. It is well known that they attack man without hesitation, but habitual 'man-eaters' are apparently less common than among tigers. For accounts of lion-hunting in Africa reference should be made to the works of Selous, Drummond, Baker, and others.

Lion of Lucerne. See LUCERNE.

Lion of St. Mark. See VENICE.

Lions, GULF of, an arm of the Mediterranean, extending from Cape Creus on the coast of Spain to Hyères Is. on the coast of France. Numerous sand-banks hinder its navigation. The rivers Rhone, Orb, Aude, and Tet empty into it, and the towns of Marseilles, Cette, and Port Vendres are on its shores. Its name is derived from the raging and roaring of its waves. The spelling Lyons is erroneous.

Liottard, JEAN ETIENNE (1702-89), Swiss painter, born in Geneva. He worked in enamel and pastel, and painted miniatures. Sir Everard Fawkener brought him to England, where he painted many portraits. His famous pastel, *The Vienna Chocolate Girl*, is in the Dresden gallery. *La Belle Lyonnaise* is in Amsterdam.

Lipa, tn., Luzon, Philippines, 14 m. N.E. of Batangas. The district produces sugar, cacao, tobacco, and indigo, and formerly coffee, but in 1889-90 the coffee plantations were destroyed by insect pests. Pop. 40,000.

Lipari (or **Æolian**) **Islands** (anc. *Æolice* or *Vulcanic*), volcanic group in Mediterranean, off N. coast of Sicily and N.W. of Messina, consists of seven large and numerous small islands. The most important is Lipari. The next in size are Vulcano, Stromboli, Salina, Filicudi, Alicudi, and Panaria. Stromboli (3,090 ft.) is constantly active; Vulcano (1,017) is intermittent. Lipari, the chief town of the islands, stands on the E. side of Lipari I., which is 5 m. long and 4 m. broad, and produces large quantities of grapes, figs, olives, corn, wine, and currants. The town exports pumice stone, sulphur, fish, and malmsey wine. Pop.—tn., 12,000; group (1901), 20,455.

Liparis, a genus of orchids of very wide distribution. The flowers are usually small and dull-coloured, so that the plants are not often cultivated. Most of them require stove treatment; but *L. Loeselii*, with yellow flowers, and *L. lilifolia*, with dull purple flowers, two North American species, are hardy in this country.

Liparite, a name given to a group of quartzose igneous rocks, occurring as lavas, from their abundance in the Lipari Is. See RHYOLITE.

Lipetsk, tn., Tambov gov., Central Russia, 90 m. W.S.W. of Tambov city, cap. of dist., at confluence of Lipovka with Lyesnoi-Voronej; has sugar works, iron foundries, tanneries, brick-kilns. There are chalybeate mineral springs. Pop. (1897) 20,323.

Lipogram (Gr. *leipo*, 'I leave'), a form of literary trifling, wherein the author excludes some letter or letters of the alphabet throughout the composition. The most gigantic lipograms on record are two Greek poems produced by Tryphiodorus—the one a kind of *Iliad* in twenty-four books, each excluding absolutely the letter of the alphabet marking its own number; the other an *Odyssey*, composed on the same principles. Gregorio Leti also wrote a discourse called *The Exiled R*, because the letter *r* was omitted throughout; Rückert wrote German poems excluding *r*; and Lope de Vega, the Spanish dramatist, wrote five novels, each of which avoids some particular vowel.

Lippa, comm. and health resort, prov. Temes, Hungary, on Maros R., 22 m. S.E. of Arad; has important cattle fairs and manufactures of pottery. Pop. over 7,000.

Lippe (sometimes called LIPPE-DETMOLD), sovereign principality of Germany, N.E. of Westphalia, between the Teutoburger Forest and the Weser R. Area, 469 sq. m.; pop. (1900) 138,952, nearly all Protestants. The country is well wooded and hilly. Over 50 per cent. of the area is cultivated, mostly in small holdings. Starch, salt, tobacco, bricks, and beer are manufactured. Cap. Detmold. Lippe has one vote in the Imperial Federal Council, and one representative in the Imperial Diet. The dynasty dates from the middle of the 10th century, the status of a principality of the empire from 1720. On the death (1904) of Count Ernst, prince-regent of Lippe-Detmold, a dynastic controversy arose. This was decided (1905) by the Supreme Court of the German empire at Leipzig, acting as a court of arbitration, in favour of his son, Count Leopold, who then assumed the title of Leopold III., prince of Lippe.

Lippe-Schaumburg. See SCHAUMBURG-LIPPE.

Lippi, FRA FILIPPO—known as 'Fra Lippo Lippi'—(1412-69), celebrated Florentine painter, was placed while very young in a Carmelite monastery, which he left in 1432 with no pronounced ecclesiastical stamp upon him, but carrying away an artistic power largely due to his study of the works of Masaccio. He became chaplain to the convent of San Giovannino at Florence (1452), and prior of Santa Margherita at Prato (1456). It was here that he met, according to Vasari, the beautiful Lucrezia Buti, afterwards the mother of his son Filippino. One of the greatest painters of his age, Fra Lippo Lippi combined a wealth of colouring and an unerring

composition peculiarly his own with a disregard of perspective which was general in his day. Among his great works are the frescoes dealing with the lives of St. Stephen and St. John the Baptist in the cathedral at Prato, and Madonnas to be seen in several of the great continental collections. See Strutt's *Fra Filippo Lippi* (1901).

Lippi, FRA FILIPPINO (1460-1504), painter, son of the preceding, studied under Fra Diamante, and probably gained much also from the works of his father and of Botticelli. With some characteristic differences, Filippino's work is in no sense behind that of his father. Among his greatest works are frescoes in the Brancacci chapel at Florence, depicting a series of episodes in the lives of St. Peter and St. Paul, closing with the crucifixion of the former; an altar-piece in Santo Spirito, and another now in the Uffizi Gallery; the *Vision of St. Francis*, in the Badia at Florence; and the *Marriage of St. Catherine*, in San Domenico, Bologna.

Lippia, a genus of shrubs, order Verbenaceæ, having small, solitary flowers in the axils of the bracts. The best-known species is *L. citriodora*, the lemon plant, or scented verberna; it requires greenhouse treatment in most parts of Britain, though it grows in sheltered positions out of doors in the southern counties.

Lippincott, JOSHUA BALLINGER (1813-86), American publisher, born in New Jersey of Quaker parentage, and founded the great publishing firm of J. B. Lippincott and Co. (1836), which became in 1850 the head of the book trade in Philadelphia. He established *Lippincott's Magazine*, *The Medical Times*, and a London agency for facilitating the importation of European literature into America. *Lippincott's Magazine*, founded in 1868, and in 1899 renamed *The New Lippincott*, is one of the best of American monthly periodicals.

Lippmann, GABRIEL (1845), French physicist, born in Luxembourg. In 1883 he was appointed professor of mathematical, and in 1886 of experimental, physics in Paris. His principal work has been in investigating the effect of electro-motive force on capillarity, to which we owe the capillary electrometer; in inventing the interference method of colour photography, and in determining electrical units. His works include *Cours de Thermodynamique* (1886) and *Cours d'Acoustique et d'Optique* (1888).

Lippstadt, tn., Westphalia, Prussia, on Lippe R., 39 m. E. of Dortmund; manufactures tobacco, brandy, ropes, and brushes. Pop. (1900) 12,534.

Lipsius, RICHARD ADELBERT (1836-92), German theologian, was born at Gera, and became professor successively at Leipzig (1859), Vienna (1861), Kiel (1865), and Jena (1871), where he also acted as *Geheimer Kirchenrath*. He was joint-author of the *Handkommentar zum Neuen Testament* (1891), to which he contributed Galatians, Romans, and Philipians. Other important publications by Lipsius are *The Ignatian Letters* (1859), *Gnosticismus* (1860), *Lehrbuch der Evangelisch-protestantischen Dogmatik* (1876), *Philosophie und Religion* (1885), *Die Apocryphen Apostelgeschichten und Apostellegenden* (1883-7).

Lipton, SIR THOMAS JOHNSTONE (1850), British merchant, was born in Glasgow of Irish parentage. Very successful in retail business, he also acquired extensive tea, coffee, and cocoa estates

pletely separates into its two components on solidifying undisturbed, a similar though less complete action taking place with other metallic mixtures. Liquefaction plays a very important part in determining the composition and properties of commercial alloys. An ingot of copper and silver alloy may have a distinctly different composition in different parts, and thus be unsuitable for coinage; whilst specimens of steel, iron, and other metals may have quite different strengths through local liquefaction taking place to a greater or less extent, though in the mass they may have the same percentage composition. Liquefaction is employed to separate some metallic mixtures by a sort of fractional melting, the more fusible component running off first. It is used in this way to separate

clude absinthe, aniseed cordial, benedictine, chartreuse, clove cordial, trappistine, curaçoa, kummel, maraschino, kirschwasser, noyau, crème de menthe, vermouth, sloe gin, and cherry brandy. Of these the preparation of absinthe and sloe gin may be taken as typical. The former is obtained from purified grain spirit, flavoured principally with oil of wormwood, but also with other herbs, such as angelica and peppermint. It is distilled, coloured with chlorophyll from spinach, and sometimes slightly sweetened, the product containing about 50 per cent. of alcohol. Sloe gin is prepared by steeping the ripe and pierced fruit in gin or in rectified spirit, dissolving simultaneously the desired proportion of cane-sugar or sugar candy. The product is afterwards filtered and matured.



A Painting by Fra Filippo Lippi—'The Annunciation.'

in Ceylon; and in 1896 the business was converted into a limited liability company, with a capital of £2,500,000, of which he is the chairman. He is also largely interested in business enterprises in America. In 1898 he received the honour of knighthood, and further marks of the royal favour were bestowed upon him in 1901, when he was made a K.C.V.O.; and in 1902, when he was created a baronet. Sir Thomas Lipton has made three unsuccessful attempts, with *Shamrock I.*, *Shamrock II.*, and *Shamrock III.*, to wrest the America Cup, an international yachting trophy, from the New York Yachting Club. See AMERICA CUP.

Liquefaction describes the separation of the constituents of an alloy when cooling down from the molten state. Thus a mixture of lead and zinc almost com-

native bismuth from the non-metallic impurities with which it is mixed, and to purify tin and other substances, the mixture being cautiously heated on a sloping hearth or in an inclined tube. See EUTECTIC.

Liquefaction of Gases includes those processes of cooling and compression by which gases such as air or carbon dioxide are reduced to the liquid state. The theoretical conditions pertaining to the change and the practical methods of carrying them out are fully described under GASES AND VAPOURS.

Liqueurs are strongly alcoholic beverages prepared from grain spirit, rectified spirit, or other form of alcohol, flavoured with various fruit or herb extracts, usually sweetened and coloured, and sometimes distilled. The more important in-

Liquid is that state of matter in which the particles can be made to flow over each other by the least assignable force, if sufficient time is allowed, and which also possesses a definite volume—i.e. will only occupy a portion of the vessel containing it equal to its own volume—thus differing from a gas, which spreads itself out evenly throughout any volume that may be free to it. These features result in certain characteristic properties of liquids. Thus the free surface—i.e. the surface not in contact with, or in the immediate neighbourhood of, the vessel—is level and horizontal if the liquid is at rest, the shape and ramifications of the vessel into tubes and the like not affecting the height to which it rises. Another consequence is that the pressure under a liquid is exerted equally in all

directions, is also independent of the vessel, and is proportional only to the density of the liquid and to the vertical height from the surface under pressure to the free surface of the liquid.

The phenomena of flotation and its manifold applications also result from the same properties—a body immersed in a liquid experiencing a buoying-up force equal to the weight of liquid it displaces. Liquids, with regard to volume, are perfectly elastic, though under ordinary circumstances highly incompressible; thus water only diminishes one-millionth of its bulk for an increase of one atmosphere pressure—a fact made use of in hydraulic machinery. The compressibility increases with the temperature, until in the neighbourhood of the critical point it approaches that of a gas. Although much more difficult to observe, liquids will also withstand tensile stress, the coefficient of volume elasticity for alcohol having been shown by Worthington to be the same for tensile as for compressive stresses. Liquids are, in general, isotropic—i.e. they exhibit identical properties in every direction—though recently certain 'liquid crystals' have been described which have differences in optical behaviour according as they are viewed.

Besides the properties exhibited by liquids in the mass, there are many important features due to their minute structure, of which those connected with the surface tension, the viscosity, and the phenomena of diffusion and osmosis, are the most important. The surface tension is a molecular action occurring in the very thinnest imaginable outside layer of the liquid, and having the same effect as if the liquid were enclosed in an elastic skin which is ever trying to make itself smaller, with a force which, in the case of water and mercury, at 0°C. is equal to 75.8, and 527.2 dynes per centimetre of length of the film, respectively. Surface tension is the cause of very many interesting and diverse actions, such as the capillary rise of liquids in fine tubes, the formation of drops and soap bubbles, the meniscus-shaped surface of liquids, the characteristic appearance of jets of liquids, the motion together or apart of scraps of floating matter, and the calming of rough water by oil.

The viscosity of liquids represents the molecular friction, and is the resistance that one part of the liquid exhibits in flowing past another, which, though it can be overcome by the least assignable force, as already stated, takes very varying times in the process. Thus though pitch, which may be looked

upon as an extreme case of a viscous liquid, may take years to flow through a funnel, the same flow may be accomplished by an oil in minutes, and by water and alcohol in seconds. Viscosity varies much with temperature, the coefficient, which is determined by the volume v that flows through a capillary tube of radius r and length l , being = $\frac{h\pi r^4 dg}{8lv}$, if d is

the density of the liquid, h the height of its column, and g the acceleration of gravity. The coefficient for water at 0°C. = 0.0173, at 10°C. = 0.0131; whilst for alcohol at 10°C. = 0.0154, for mercury at 17.2°C. = 0.16, and for glycerin at 2.8°C. = 42.18.

Viscosity is utilized in lubrication by oils, which form a layer between the rubbing surfaces, and if sufficiently viscous, with regard to the pressure, to resist being squeezed out, reduces the friction from that obtaining between two solids to the much smaller friction between the liquid particles.

The diffusion and osmosis of liquids, or power that a particle of a liquid has of transferring itself from one point to another in the liquid, even against gravity or the rough membranes, are closely allied effects, explainable on the theory that the molecules of a liquid, like those of a gas, are in motion, though of a more restricted character. On this account the diffusion of liquids is very much slower than that of gases, but differs for different substances in a somewhat similar manner. Different substances diffuse in solution at rates that are slower the heavier and more complex the molecules. This difference is made use of to separate substances with molecules of different size in the process of dialysis, in which glue-like materials, such as starch, albumin, or silicic acid, are separable from sugar, salts, and the like, by diffusing the mixed solution through a parchment paper diaphragm, the larger molecules being retained.

Osmosis is a similar process, but differs in that the membrane, such as copper ferrocyanide supported in porcelain, is such that only solvent molecules pass, and not those of the dissolved substance or 'solute.' If, then, a solution is separated from the pure solvent by such a membrane, the solvent passes through to the solution, and a pressure is set up which is found in the case of dilute solutions to be equal to that which the solute would exert if distributed throughout the same space in the state of gas. The action of osmosis, no doubt, plays a very important part in the physiological processes of both animals and plants.

The phenomena of the change

of liquid to solid, and liquid to gas, and conversely, are described in the articles on FREEZING, EVAPORATION, and GASES AND VAPOURS; while the special properties of liquids when in motion are included in the article on HYDROKINETICS. See also HYDROSTATICS, CAPILLARITY, DIFFUSION, DIALYSIS, OSMOSIS, and KINETICS.

Liquidambar, a genus of deciduous trees, order Hamamelidaceae. They bear catkins of monocious flowers, and the leaves and stems are very fragrant from the resin they contain. The commonest species is *L. styraciflua*, the sweet gum, a very decorative North American tree which bears greenish-yellow flowers and palmately-lobed leaves, which become red in autumn.

Liquidated Damages. See DAMAGES.

Liquidation. See BANKRUPTCY and COMPANY.

Liquorice, the root or underground stem of the plant *Glycyrrhiza glabra*. As it occurs in commerce the root is usually in cylindrical-branched pieces—tough, and brown in colour. It is sweet and mucilaginous to the taste. The sweet taste is due to a non-fermentable substance called glycyrrhizine. The extract obtained by macerating liquorice root in water, and subsequently evaporating to a suitable consistency, is used in pharmacy, chiefly as a sweet demulcent.

Liquor Laws. British legislation of the liquor traffic begins with the Act of 1829, which is still the basis; but there have been many modifications and amendments in detail. The Acts of 1872 and 1874 in particular made great changes in the law. The Act of 1872 fixed the hours of closing, regulated the conditions of sale, and appointed justices to deal with applications for licences and for transfers. In Scotland the fundamental act is the Home Drummond Act of 1828, which was amended by the Forbes Mackenzie Act of 1853 (itself amended in 1862 and 1867). The Irish law follows the English, but is more favourable to publicans. Hardly a session of Parliament passes without an act or at least a bill dealing with the liquor question. In 1902 an act was passed (Scotland, 1903) increasing the responsibility of publicans for drunkenness, and establishing the principle of the black list, whereby publicans, having been notified, are forbidden to supply liquor to the listed person. The growing temperance sentiment of the country has been responsible for the demand, frequently made in legislative form, for local option.

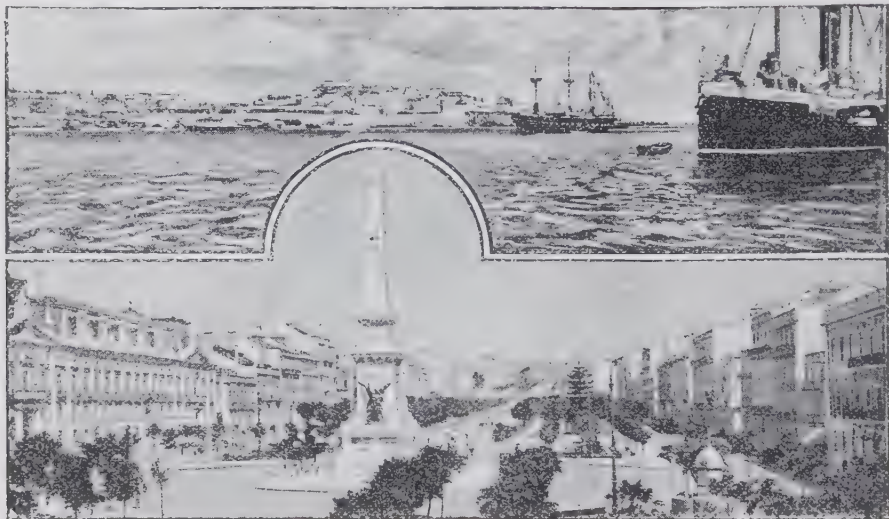
In the British colonies and in the United States public opinion is much further advanced. Canada has a local-option law known as the Scott Act, which was passed in 1878. It has been largely taken advantage of in the maritime provinces, where some towns and districts have adhered to the principle for a quarter of a century. In Quebec, except in the English-speaking section, it has been little favoured, and Ontario has gone back to the licensing system. In S. Africa there is restriction regarding the sale of liquor to natives; but there is considerable laxity in their general regulations. In Australia the practice of the various states of the Commonwealth differs. Victoria is a local-option state, while New South Wales allows a mild form

Liria (anc. *Edeta*), tn., prov. Valencia, Spain, on l. bk. of Guadalaviar, 15 m. N.W. of Valencia. Vines, olives, and esparto grass are cultivated. There are several mineral springs. Pop. (1900) 8,839.

Liriodendron. See TULIP TREE.

Lisbon (Port. *Lisboa*; anc. *Oli-sipo*, and in later Roman times *Felicitas Julia*), cap. of Portugal, and of prov. of Estremadura. It is beautifully situated, in a narrow valley flanked by hills running inland at right angles with the river, on the N. bk. of the Tagus, 12 m. from its mouth. Although the view from the river is very fine, the city itself is dull and unattractive. The principal business streets are built in the valley, replacing those destroyed

the river, and the conspicuous white marble palace of Ajuda overlooking Belem and the sea. This is the healthiest and most fashionable quarter of the city. Lisbon has several colleges, an academy of fine art, and a conservatory of music. The climate in spring and autumn is charming, the winter months being damp and mild, and the summer—especially in the enclosed valley—oppressively hot; but, generally speaking, it is healthy. Of the import trade of the port, about 25 per cent. comes from the United Kingdom; and of the exports, about 50 per cent. is sent to this country. The chief imports are grain, sugar, cotton, coal, petroleum, and timber; the exports, chiefly corn, wine, olive oil, salt, fruits, and



Lisbon from the Tagus, and the Avenida da Liberdade.

of local option with regard to new licences. In the crown colonies the systems of regulation vary a great deal, but only one, the Bahamas, has adopted local option. In all of them regulations regarding the sale of liquor to natives are strictly enforced. In the United States the practice varies. Some states, such as Maine and Kansas, have a prohibitory law for the state; others, such as Massachusetts and New Hampshire, have local-option laws; others again, such as New York, have high licence and stringent regulations. See PUBLIC HOUSE TRUSTS, and LICENCE.

Lira (pl. *lire*), an Italian silver coin. The *lira Italiana*, or *lira nuova*, is equal in value to the French franc, and is divided into 100 centesimi.

by the great earthquake of Nov. 1, 1755. The harbour, widening out in front of the city into an extensive, almost landlocked bay, is capable of sheltering the largest vessels. The highest point on the E. side of the valley is crowned by the ancient and now obsolete fortress of St. George; the cathedral is on a slightly lower point adjacent; the custom house, arsenals, ship-yards, etc., are on the river bank beneath. The public offices and library are in the Praça do Comercio, where also, before the great earthquake, the royal palace stood facing the Tagus. On the outer slopes of the hills on the W. side of the valley, towards the Atlantic and the suburb of Belem, many of the best houses are now built, including the royal palace of Necessidades, facing

fish. At Belem (3 m.) stand the fine ancient (1499) florid Gothic church of St. Jerome, and the royal mausoleum, in which is buried Catherine of Braganza, widow of Charles II. of England. Favourite railway excursions from Lisbon are to Cascaes (16 m.) on the Atlantic, the Portuguese Brighton; and to Cintra (13 m.), a region of gardens, palaces, and pleasure-houses, unequalled in Europe. Pop. (1900) 356,000.

Lisburn, tn., Co. Antrim, Ireland, on the Lagan, 8 m. S.W. of Belfast, on the Great Northern Ry. In 1662 Christ Church was constituted the cathedral for the diocese of Down and Connor. Lisburn contains the burial-place of Jeremy Taylor (d. 1637), who was bishop of the see. Manufactures damask and other linens. Pop. (1901) 12,465.

Lisianthus, a genus of plants belonging to the order Gentianaceae. Among the species are *L. pulcher*, which is evergreen, and bears terminal cymes of pendulous, funnel-shaped, scarlet flowers in late summer; and *L. princeps*, also evergreen and scarlet-flowering. They are beautiful greenhouse plants.

Lisieux (anc. *Noviomagus Lexoviorum*), tn., dep. Calvados, France, on the Touques, at its confluence with the Orbiquet, 20 m. s. of Honfleur; manufactures coarse linens, woollens, and flannels. The cathedral of St. Pierre (1045-1233) is the most interesting Gothic church in Normandy. Pop. (1901) 16,084.

Liskeard, munic. bor. and mkt. tn., Cornwall, England, 11 m. S.E. of Bodmin, was formerly a tin-mining centre. Industries include woollen goods, brewing, saw-milling, and slate and stone quarrying. There are large livestock markets. Liskeard was one of the four Cornish 'coinage towns.' Pop. (1901) 4,011.

L'Isle-Adam. See VILLIERS DE L'ISLE.

L'Isle, ALAIN DE, or ALANUS AB INSULIS (c. 1114-1202), philosopher and theologian, born at Lille; was the author of an encyclopædic poem, *Anticlaudianus*, treating of morals, science, and art.

Lismore. (1.) Island of Lorn and Appin, Argyllshire, 8 m. from Oban, 11 m. long and 1½ m. broad. The inhabitants are engaged in agriculture and fishing. It has remains of two Scandinavian forts, Ceffin and Tirfuir, and the choir of the cathedral of the pre-reformation diocese of Lismore (1236), now used as a parish church. There is a lighthouse at Port Romney (1833). Pop. (1901) 3,712. (2.) Town, Co. Waterford, Ireland, on the Blackwater, 15 m. N.N.W. of Dungarvan. A monastery and bishopric were founded here by St. Carthage in the 7th century. The present cathedral (Protestant) of St. Carthage has portions of 12th and 13th century work. Pop. (1901) 1,583. (3.) Township at head of Richmond R., 520 m. N. of Sydney, N.S.W., Australia. It is the chief town of the N. coast district. There are two large sugar-refining works and several creameries. Pop. 4,700.

Lissa. (1.) Island, Dalmatian coast, Austria. Area, 49 sq. m. Pop. (1900) 9,918. It lies just N. of 43° N. lat., and possesses a good harbour at its chief town, Lissa; pop. (1900) 5,261. Wine is the chief product. Off this island the British defeated the Franco-Venetian fleet in 1811, and here was fought (1866) the first action between squadrons of ironclads. The Austrian fleet,

though inferior, succeeded in sinking two Italian ironclads. (2.) Town, Posen, Prussia, 25 m. N.E. of Glogau; manufactures cloth, wines, liquors, and cigars, and there is considerable trade in cereals. The town was burned by the Poles in 1656, and by the Russians in 1707. Pop. (1900) 14,282.

Lissoschilus, a genus of tropical terrestrial orchids with simple racemes of usually brilliant flowers. Among the species are *L. Krebsii*, a native of Natal, having green sepals with purple blotches, and yellow petals; *L. speciosus*, with abundance of yellow flowers in summer; and *L. Horsfallii*, bearing flowers with brown sepals and large white petals flushed with pink.

Lister, JOSEPH, FIRST BARON (1827), English surgeon, born at

the hotbeds of septic poisoning, and the dread and horror of all who were unfortunately compelled to go to them. For his discoveries and scientific attainments Lord Lister has received many honours. He was president of the British Association (1896), and of the Royal Society from 1895 to 1900. In 1883 he was created a baronet, and in 1897 was raised to the peerage. In addition to many important papers in scientific journals, he has published *On the Effects of the Antiseptic Treatment upon the Salubrity of a Surgical Hospital* (1870), and *A Contribution to the Germ Theory of Putrefaction and other Fermentative Changes* (1875).

Liston, JOHN (?1776-1846), English comedian. He appeared at the Haymarket Theatre (1805),



Lisbon and Environs.

Upton, Essex; graduated at University College, London (1852). After being a surgeon in Edinburgh for several years, Lister was appointed to the chair of surgery in Glasgow University (1860), to that of clinical surgery in Edinburgh University (1869), and to the chair of clinical surgery, King's College, London (1877), from which he retired in 1893. Influenced by Pasteur's discoveries of the origin of fermentation and putrefaction, Lister began his far-reaching and important work on the cause and prevention of septic infection of wounds, which speedily led to his employing antiseptics in all surgical operations. The immediate and definite success of the Listerian treatment soon led to its adoption by surgeons everywhere, making hospitals no longer

afterwards went to Covent Garden, and thence to Coventry Lane, where he remained till 1831, when he transferred himself to the Olympic Theatre; he retired in 1837. His favourite rôle was Paul Pry.

Liston, ROBERT (1794-1847), Scottish surgeon, born at Ecclesmachan, Linlithgowshire. From 1818 to 1823 he worked in Edinburgh as a teacher of anatomy and an operating surgeon, and in 1835 became professor of clinical surgery in University College, London. Liston's fame rests mainly on his profound anatomical knowledge, and on the extraordinary dexterity and skill with which he performed the most difficult operations. His principal works are *Elements of Surgery* (1831-2) and *Practical Surgery* (1837).

Liszt, FRANZ (1811–86), Hungarian pianist and composer, was born at Raiding. As a child he possessed such extraordinary musical gifts that, when nine years of age, the expense of his musical education for six years was undertaken by Prince Esterházy (the employer of Liszt's father) and several other Hungarian noblemen. After studying for some time under Czerny and Salieri at Vienna, Liszt went to Paris, but was there refused admission to the Conservatoire by Cherubini on the ground that he was a foreigner. From 1839 to 1847 he was almost constantly travelling, giving concerts in nearly every European country, and was everywhere received with enthusiasm. While his fame as a virtuoso was at its height he retired (1849) to become conductor of the Court Theatre at Weimar. He resigned in 1861, and during the remainder of his life, spent alternately in Budapest, Weimar, and Rome, was known as the Abbé Liszt, having been permitted to take minor orders in the Church of Rome. Liszt's name as a composer is still somewhat overshadowed by his fame as a pianist. He was the creator of the symphonic poem; and his *Hungarian Rhapsodies* for the piano, also his transcriptions of orchestral compositions—especially the later ones—are still unrivalled. His literary works are considerable, and include writings on Chopin, Franz, Wagner, and on the music of the Gypsies. See Wohl's *Recollections of Liszt* (1888), and Lives by Nohl (1884), Gollerich (1888), and Ramann (1894); also Liszt's *Letters* (trans. 1894), and *Correspondence between Wagner and Liszt* (trans. 1888).

Li-tang, tn. in Sze-chuen, China, on the route to Tibet. Alt. 13,280 ft.

Litany (Gr. *litaneia*, 'a supplication'). Litanies date from the period when Christianity had so far triumphed as to be able to offer to the public forms of prayer which might supersede the petitions hitherto offered to the heathen gods. Such litanies were sung at Rome in the time of St. Gregory and St. Augustine. St. Gregory of Tours describes the litanies at Vienne in Gaul, instituted by Bishop Mamertus in 477, after an earthquake. Processional prayers suitable to special occasions were early called 'rogations.' They must have been practised in Britain for many years previous to the Council of Clovesho (747), which refers to their continuance 'according to the custom of our ancestors.' At first litanies were said only on stated days, or as notable happenings demanded, and they were associated with

penitential fasting. But as early as the close of the 5th century there are signs of their more general use. In the East they seem to have originated in the action of St. Chrysostom, who introduced processions with responses into Constantinople (398). As early as the 4th century responsorial prayers were a feature of all Eastern worship, even in the eucharist (*Apost. Const.*, viii. 6). In the West the term litany stood at first both for a penitential procession and for a service of responsorial prayer with the refrain of 'Kyrie eleison.' The two soon coalesced, and litany meant a form of prayer in dialogue, whether said in church or in procession, or whether used on particular occasions or as part of the ordinary worship. The Roman Catholic form of litany was early adopted in England, and continued till the reformation. The Litany of the Book of Common Prayer was compiled in 1544. It was published in the Primer of Henry VIII. (1545) as 'The Litany and Suffrages,' and is called 'this common prayer of procession.' It was first sung in St. Paul's Cathedral on St. Luke's Day, 1545. It is appointed for 'Sundays, Wednesdays, and Fridays, and at other times when it shall be commanded by the ordinary,' and is either said or sung immediately after morning prayer, or matins. See Procter and Frere's *New History of the Book of Common Prayer* (2nd ed. 1902); Pullan's *The Book of Common Prayer* (3rd ed. 1901); Blunt's *The Annotated Book of Common Prayer* (new ed. 1903).

Literary Forgery. There is scarcely a sphere of literary achievement in which the literary forger has not made his mark. The following is a list of the principal literary forgers:—(1.) Annus of Viterbo (b. 1432), who produced poems which he ascribed to Archilochus, and histories which he claimed for Fabius Pictor. (2.) George Psalmanazar, who published his fabricated description of Formosa in 1704. (3.) James Macpherson, who in 1762–63 manufactured 'Poems' in the name of 'Ossian.' (4.) Thomas Chatterton, who in 1769 deceived Walpole, Bryant, and other scholars with writings which he attributed to Thomas Rowley, a monk of Bristol. (5.) Samuel William Henry Ireland, who in 1796 forged a 'new play by Shakespeare,' entitled *Fortigern* (1769). (6.) The undiscovered writer of the spurious Shelley 'Letters' published by Moxon (1852). (7.) John Payne Collier, who executed the 'Perkins Folio' emendations and other Shakespearean forgeries (1849–52). (8.) Alcibiades Simonides, who tried

to impose upon the British Museum with documents said to have been written by Homer, Belisarius, Aristotle, Alcibiades, and others. (9.) Dr. Shapira, who in 1883 professed to have received from an Arab sheik a manuscript of Deuteronomy written on sheepskin in a character almost identical with that of the Moabite stone. (10.) Richard Piggott, who forged the Parnell letters (1886). (11.) Alexander Howland Smith, known as 'Antique Smith,' who was convicted at Edinburgh (1893) for the forgery of an enormous number of historical and other documents.

Litharge, lead monoxide (PbO), occurs native as lead ochre, but is chiefly obtained by the oxidation of lead in the process of cupellation, the product of oxidation at lower temperatures being known as *massicot*. The fused litharge is ground, forming an insoluble yellowish to reddish powder of sp. gr. about 9. Litharge is used as a component of flint glass, to glaze earthenware, and in the preparation of the compounds of lead.

Litherland par. and mrkt. tn., Lancashire, England, 4 m. N.W. of Liverpool, of which it is a residential suburb; manufactures matches. Pop. (1901) 14,020.

Lithgow, township, dist. of Hartley, 96 m. N.W. of Sydney, N.S.W., Australia, in a valley of the Blue Mts.; has collieries, potteries, and brickmaking works in the vicinity. Pop. 5,600.

Lithgow, WILLIAM (1582–?1645), Scottish traveller, born at Lanark, left his native country about 1610, and travelled through Italy, the Levant, and Egypt, making, on a second tour, an exploration of N. Africa. His third journey saw him in the hands of Spanish inquisitors at Malaga, and he was only rescued by the interference of the English consul (1621). In a later journey he was present at the siege of Breda, of which he published an account (1637). His *Total Discourse of the Rare Adventures and Painful Pereginations of long Nineteene Yeares Travayles* (1632) is of great interest.

Lithium (Li, 7.03) is an element of the alkali-metal group. It is widely distributed in combination, occurring in many minerals, waters, and soils—the chief source being its silicate, which is found as a mineral, *lepidolite*. Lithium is obtained by the electrolysis of its fused chloride, and is a soft white metal (m.p. 180° c.), the lightest solid known (sp. gr. .59). Lithium carbonate and citrate are used in medicine in cases of gout, gravel, and other ailments, to remove uric acid, lithium urate being a soluble salt.

Lithography. See PRINTING.

Lithology. See PETROGRAPHY.

Lithomarge, a compact variety of kaolin or of clay, soft, unctuous, and friable. It is usually white or gray, and is found in Cornwall, Germany, America, and elsewhere.

Lithospermum, a genus of hardy herbaceous plants, order Boraginaceæ. The flowers are borne in bracteated cymes, the corolla being funnel-shaped. *L. prostratum* is a beautiful, trailing, evergreen rock plant, bearing deep blue gentian-like flowers in summer; *L. Gastoni* bears large blue flowers in terminal clusters; *L. purpureo-cæruleum* is a native of Britain.

Lithotomy (Gr. *lithos*, 'a stone;' *tome*, 'cutting') and **LITHOTRITY** (Gr. *lithos*, 'to crush or grind') are methods for the removal of calculus or stone from the bladder. Lithotomy involves cutting, and the breaking up of the calculus by an instrument called a lithotrite introduced through the wound, while by lithotrity the stone is crushed into fragments small enough to be removed through the urethra. Three operations are in vogue for the performance of lithotomy. In two of these the incision is made in the perineum; in the third or suprapubic operation, that part of the bladder wall which is not covered by peritoneum is opened above the pubes. Each operation has its own advantages, and each is specially adapted for certain cases.

Lithuania (Litva), region of N.W. Russia, lying between 52° 30' and 57° 45' N., and between 20° 50' and 28° 20' E. The Lithuanian country proper is the land between the Lower Dvina and the Niemen, but the name of Lithuania has been applied to a much larger region, embracing the whole or great part of the conquests of the great princes and kings of the 14th and 15th centuries, and extending far towards the Black Sea. Since 1840 the use of the term has been forbidden in Russian official language, but it is still commonly employed to include Grodno and Vilna governments *par excellence*, and sometimes those of Kovno and Vitebsk as well. These four have an area of 65,260 sq. m., and a population of over 6,200,000. The geography of this region, and its physical, political, and economical conditions, are fully dealt with under the separate governments.

In 1870 it was estimated that 843,000 Lithuanians (properly speaking) lived in Kovno and Vilna governments, and in Suwalki; but the term was also extended to the Letts (over 1,115,000

in 1870), to the Kurs (185,000), to the Samogitians or Jmudes (664,000), and to the extinct Borussians or Prussians. From the 10th century the Lithuanians have been divided into the three chief branches of (1) Lithuanians proper, (2) Letts or Latvians, (3) Prussians. The Prussians have always apparently been confined to the Baltic coast near the Lower Vistula, chiefly to the east of that river; they have been wholly absorbed by Germanic influences. The Letts, pushed towards the north, have been largely mingled with Livonians and Estonians. The Lithuanians proper, after founding an independent power of vast extent, joined more and more closely with the Poles, and fell under the Russian sway at the dissolution of the Polish state. The Lithuanian tongue has great affinities with Slavonic, but cannot be considered a Slav language; it is by far the most archaic of all living Aryan tongues. Before the union with Poland (begun in 1386 and consummated in 1569), the Lithuanians were either pagan (the vast majority were heathen up to 1386) or Greek Orthodox. The Polish connection established the ascendancy of Roman Catholicism.

The greatness of Lithuania began with Ringold in 1235, when parts of Red and Black Russia began to fall under Lithuanian sway, and with his son Mindvog (Mendog, Mendove), 1247-63, the first of his nation known to the west. Lithuania reached its greatest extent by the subjugation of Smolensk principality (1415); it now stretched eastward to Vyazma (on the Moskva) to Kaluga, south-east to Poltava, and the Sea of Azov, south to the site of Odessa, and the mouths of the Dnieper and Dniester. Kiev, the chief city of the older Russians, was well within its borders. In the 16th century the rising power of the new Russia, led by the czars of Moscow, seriously diminished the power and extent of Lithuania to the east, and drove it into the closer union with Poland effected at Lublin in 1569. Its history from that time is that of Poland, and in the dismemberment of the Polish 'republic' (1772, 1793, 1795) fell wholly to Russia. Since absorption by Russia many Lithuanians have returned to the Greek Church. Kosciuszko was a Lithuanian, and the province of Vilna was a main centre of the Polish insurrection of 1863, crushed in Lithuania by General Muraviev.

Litin, tn., Podolia gov., S.W. Russia, cap. of dist., 75 m. N.E. of Kamenets-Podolsk, on the Zgar, tributary of (southern) Bóg. Pop. (1897) 9,428.

Litmus is a colouring matter obtained from certain lichens, *Rocella tinctoria* (S. Africa and Chile) and *Lecanora tartarea* (Europe). It is prepared by fermenting a mixture of the lichen with potassium carbonate for five or six weeks, keeping it wet the while with a solution of ammonium carbonate in urine. The product is mixed with gypsum, moulded into cubes, and dried. Litmus is used, though not to so large an extent as formerly, as an indicator in acidimetry, being turned red by acids and blue by alkalis.

Litre is a metric measure of capacity both dry and liquid. It contains one cubic decimetre—i.e. the volume of a cube with sides 10 centimetres long—and is equal to 1.76 pints.

Littleborough, tn., Middleton div., Lancashire, England, 3 m. N.E. of Rochdale, in mining and quarrying district; has cotton and woollen manufactures. Pop. (1901) 11,160.

Little Colorado, riv. of the S.W. part of the United States, a branch of the Colorado of the west. It rises in the western part of New Mexico, and flows W. and N.W. to its junction with the Colorado. Most of its course is over a desert plateau, in which, near its mouth, it has cut a deep cañon. Length, 277 m.

Little Egypt, or frequently **EGYPT**, was the popular name of a country recognized in Europe during the 15th and 16th centuries as the place of origin of the wandering people who consequently became known as Egyptians, or, in the abbreviated English and Spanish forms, Gypsies and Gitanos. It has been shown by Grellmann that the Turkish emperor in 1652 (Achmetiv.) included among his titles that of 'King of the Greater and Lesser Egypt.' Mazaris, a Byzantine author, writing about the year 1416, says that at that date the Peloponnese was inhabited by 'seven principal nations,' of whom one was that of the 'Egyptians'—that name then having the significance of 'Gypsies,' and not denoting the natives of Egypt. If, then, Gypsies formed one of the principal nations in the Morea in 1416, it is probable there were Gypsies in Epirus, otherwise 'Little Egypt,' at that date. The acceptance of Epirus as the 'Little Egypt' understood by various European nations in the 15th century is fully in accordance with the assertion made by the contemporary Gypsies that they had been driven from their country by the Turks.

Little Englander, a political nickname applied by certain Imperialists to those whom they conceive to be opposed to the maintenance and further extension of the British empire.

Little Falls. (1.) City, Herkimer co., New York, U.S.A., on the Mohawk R. Good water-power has materially assisted in the manufacturing development of the city. Bicycles, knitted goods, paper, and leather are made. Pop. (1900) 10,381. (2.) City and co. seat, Morrison co., Minnesota, U.S.A., on the Mississippi, 96 m. N.W. of Minneapolis, in an agricultural and lumbering district; has manufactures of paper and agricultural implements, breweries, flour mills, and brick works. Pop. (1900) 5,774.

Little Fish Bay. See MOS-SEDES.

Littlehampton, par., seapt. tn., and wat.-pl. on the Sussex coast, England, 10 m. S.E. of Chichester. It is the port of Arundel, and has fine golf links. Queen Matilda landed here in 1139. Pop. (1901) 7,363.

Little Java. See BALI.

Little John. See ROBIN HOOD.

Little Rock, city, Arkansas, U.S.A., on the Arkansas R., the co. seat of Pulaski co., and the cap. and largest city of the state. It is an important commercial and manufacturing city. The industries include cotton gins and presses, cotton-seed oil and cake works, foundries, and machine shops. Pop. (1900) 33,307.

Littlestone - on - Sea. See ROMNEY, NEW.

Littleton, SIR THOMAS (1402-81), English jurist, judge of common pleas under Edward IV., is remembered chiefly for his work on *Tenures*, a complete digest and classification of the English law of property, then chiefly concerned with land. Originally written for the benefit of his son, the work became widely known, was translated from the original Norman-French, and received high eulogy from Sir E. Coke. In its first edition (ascribed to 1481) it ranks as one of the earliest printed books. See *Coke on Littleton*; also the *Paston Letters*, ed. by Gairdner (1872; new ed. 1893).

Littonia, a genus of liliaceous plants, with orange-coloured, drooping, bell-shaped flowers and light green leaves ending in tendrils. *L. modesta*, a native of Natal, is a desirable greenhouse plant.

Littoral Deposits are such as are accumulating in comparatively shallow water around the edges of the oceans and seas. They consist of the coarser débris derived from the wear and tear of the continental land, such as sand, gravel, and mud. The term is often used as synonymous with 'shallow water beds.' On their seaward margin they pass gradually into the 'deep water deposits,' such as the fine blue and green muds and the organic ooze.

Litré, MAXIMILIEN PAUL ÉMILE (1801-81), French lexicographer, philosopher, and author, studied medicine, fought on the Parisian barricades of 1830, and in 1835-6 began his literary career as a contributor to the *National* and the *Revue des Deux Mondes*. In 1839 appeared the first volume of his translation of Hippocrates, completed in 1862. His adoption of the positivist philosophy marks an era in his life; while the variety of his pursuits in middle and later life testified to the versatility of his powerful intellect. His works on positivism include *Application de la Philosophie Positive au Gouvernement* (1849); *Conservation, Révolution, et Positivisme* (1852); *Paroles de Philosophie Positive* (1859); and *Auguste Comte et la Philosophie Positive* (1863). His translations include Pliny's *Natural History* and Strauss's *Life of Jesus*. He also rendered valuable assistance in the preparation of the *Histoire Littéraire de la France*, and found time and energy for his great *Dictionnaire de la Langue Française* (4 vols. 1863-72; supplement, 1878). Connected with this is his *Histoire de la Langue Française* (1862). By the remarkable width and depth of his knowledge, united as it was to restless activity of intellect and distinguished literary ability, Littré is marked as one of the great men of 19th-century France. See Sainte-Beuve's *Notice sur M. Littré* (1863), M. Durand-Gréville in the *Nouvelle Revue* (August 1881), and *The Edinburgh Review* (1882).

Liturgy (Gr. *leitourgia*, 'public service'). The term *liturgy*, though used loosely of the entire prayer-book, is more properly applicable to the Office for the Celebration of the Holy Communion. In ancient liturgies the service was divided into two parts. The first was open to those under instruction who had not yet been baptized: it was known as the *Missa Catechumenorum*. The second part was termed the *Missa Fidelium*, to which the baptized alone were admitted.

Justin Martyr gives a brief account of the eucharist in his *Apology*, written about A.D. 152. The canons of Hippolytus, written about A.D. 235, give some further details. St. Augustine mentions the supplications, which were made before the blessing of the elements, and the prayers and intercessions after the consecration, together with the concluding thanksgiving. The *Missa Fidelium* of the 4th century seems to have consisted of the following:—Various prayers; the kiss of peace; the oblation of the elements; the consecration, which included the narration of the in-

stitution of the eucharist by Christ, an invocation of the Holy Spirit to cause the bread and wine to be the body and blood of Christ, an intercession for the living and the dead, and the Lord's Prayer; the communion, which included the breaking of the bread and other manual acts; the reception; a thanksgiving; and the dismissal (*missa*) of the faithful.

Mr. Pullan, in *The History of the Book of Common Prayer* (3rd ed. 1901), thus describes 'the great national families of the liturgy which already existed between the 4th and 7th centuries':—(1.) *The West Syrian Rite*. This is represented by the Greek liturgy of St. James. A Syriac version of this liturgy is still in use among the Maronites, a sect very numerous in the Lebanon, which has been united with the Roman Catholic Church since the 12th century; and also by the Syrian Monophysites in Asia Minor, Syria, and India. We have also some knowledge of the *Palæstinian Rite*, once used at Jerusalem, and of which mention is made by St. Jerome and St. Cyril of Jerusalem. (2.) *The East Syrian or Persian Rite*. This is now used by the Nestorians on the borderland of Turkey and Persia. (3.) *The Byzantine Rite*, which is now used throughout the Orthodox Eastern Church by all Greek-speaking Christians and by the Roumanians, Serbs, Bulgarians, Georgians, and others. This rite comprises three liturgies, that of St. John Chrysostom, of St. Basil, and of St. Gregory Dialogos. The *Armenian Rite* is a product of the Byzantine. (4.) *The Egyptian Rite*. A later development of this is the liturgy of St. Mark. The Copts still use a Coptic version of this liturgy. (5.) *The Roman Rite*. In the 3rd century the Western Church abandoned Greek as its official language. The earliest form of the Roman Catholic mass is in the *Leonine Sacramentary*, discovered at Verona about 1735. (6.) *The Gallican Rite*, a Latin rite used in France, Spain, and the British Isles.

With regard to the liturgies in use in Great Britain and Ireland before the Norman conquest, they may be divided into Celtic and Anglo-Saxon. The *Stowe Missal*, probably written in Tipperary in the 10th century, contains 'the most complete relic of the ancient Celtic eucharist.' The *Book of Deer*, written before 1130, contains a fragment of the Celtic Church in Scotland. Other fragments are found in Celtic books of Irish origin, as the *Book of Dimma*, in the 7th century; and the *Antiphonary of Bangor* (in Ireland), which belongs to the Ambrosian Library at Milan, and

which dates from the 7th century. The Anglo-Saxons used the Roman liturgy. After the conquest the 'uses' of the different dioceses varied considerably. The principal were those of Hereford, York, and Sarum. The celebrated *Sarum Use* was introduced by Osmund, bishop of Salisbury, about 1078. The best-known service books used in England shortly before the reformation were the *Missale*, or Mass Book; the *Lectio-narius*, or Book of Lessons;

the church of Jerusalem; St. Mark's, used in the church of Alexandria; St. Chrysostom's, used at Constantinople; St. Basil's, also at Constantinople; St. Basil's, at Alexandria; the liturgies of Ethiopia, of Nestorius, and of Severus; the Gothic missal, the Gallican, the Mozarabic, and the Roman.

It will be found interesting to compare the modern English liturgy with the mediæval missals.

MEDIÆVAL MISSALS.

Veni Creator.
Collect for Purity.
Psalm 43.
Introit.
Kyrie Eleison (three times).
Lord's Prayer.
Confession and Absolution.
Gloria in Excelsis.
Collect for Day.
Epistle and Gospel.
Nicene Creed.
Oblation.
Lift up your hearts (Sursum
Prayer for Church. [corda].
Consecration.
Commemoration of Departed.
Agnus Dei.
Prayer of Access.
The Communion.

Thanksgiving.
Anthem.
Benediction.

BOOK OF COMMON PRAYER.

Hymn.
Lord's Prayer.
Collect for Purity.
Ten Commandments, and
Kyrie Eleison (ten times).
Collect for Sovereign.
Collect for Day.
Epistle and Gospel.
Nicene Creed.
Oblation.
Prayer for Church.
Exhortation.
Invitation.
Confession and Absolution.
Comfortable Words.
Lift up your hearts.
Prayer of Access.
Consecration.
The Communion.
The Lord's Prayer.
Thanksgiving.
Gloria in Excelsis.
Benediction.

the *Evangelistarium*, or Book of Gospels; the *Antiphonale*, or *Graduale*, and the *Troparium*, containing certain choral parts of the mass. There were also the *Processionale*, containing hymns, litanies, etc., suitable for processions; the *Manuale*, or book of offices; the *Pontificale*, or episcopal rites; the *Hymnarium*; the *Portiforium*, or daily services; and the *Psalterium*, or psalms divided into daily portions. There was also a popular layman's prayer-book called the *Primer*. In 1542 the Breviary of Sarum was followed throughout the province of Canterbury. In 1543 Convocation commenced the reforming of mass books, and in 1548 a commission of bishops issued *The Order of the Communion*, which, among other reforms, restored the chalice to the laity, but continued the use of wafer bread. The Book of Common Prayer acquired its present form through several revisions until it was finally adjusted and accepted at the Savoy Conference in 1661.

The following is a list of the principal liturgies:—The Clementine, found in the apostolical constitutions; St. James's, used in

For further information consult Neale's *Introduction to the History of the Holy Eastern Church* (1868), Hammond's *Liturgies Eastern and Western* (1878), and Maskell's *Ancient Liturgy of the Church of England* (1844).

Liutprand, or **LIUDPRAND** (c. 922-c. 972), Italian bishop and chronicler at the court of Berengarius of Italy, by whom he was sent on an embassy to Constantinople in 949. But the withdrawal of his patron's favour sent Liutprand to the court of Otto I. of Germany, after whose invasion of Italy he became bishop of Cremona. He took his revenge on Berengarius in *Antapodosis*, a history of the period 886-950. He also wrote *De Rebus Gestis Ottonis Magni Imperatoris* (960-4); and a satire, *De Legatione Constantinopolitana* (968-9). The best edition of his works is in the *Monumenta Germanicæ Historica*. See Köpke's *De Vita Liudprandi* (1842), and Baldeschi's *Liudprando* (1889).

Livadia. (1.) Township, 3 m. s.w. of Yalta town, on s. coast of Crimea, S. Russia. It is famous for its Russian imperial residence, a favourite resort of

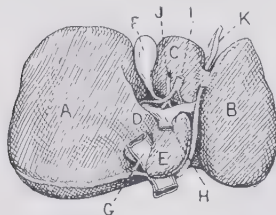
Alexander II., and much used by his successors. (2.) (Gr. *Lebadeia*), tn., nomarchy of Boeotia and Attica, Greece, on Lamos, near Lake Copais, 57 m. N.W. of Athens; owed its importance in ancient times to the subterranean oracle of Trophonios. Produces oil and grain. Pop. (1896) 6,494.

Livinge, **GEORGE DOWNING** (1827), English chemist and spectroscopist, educated at St. John's College, Cambridge. He was professor of chemistry at the Royal Military College, Sandhurst (1860), and has been professor of chemistry, Cambridge, since 1861. In addition to numerous papers on spectroscopy and crystallization, he has published *Chemical Equilibrium* (1885); *Ultra Violet Spectra of the Elements* (1883-8), with Professor Dewar; *Spectrum of Oxy-Hydrogen Flame* (1888); and, with Mr. Warren, *Report on University Colleges* (1897).

Liver. The liver is the largest gland in the body, weighing nearly four pounds, and measuring about eleven inches in transverse diameter. Its upper surface is convex, and lies in contact with the diaphragm above; while its lower surface is concave, arching over and touching the stomach, intestine, and right kidney. In shape the liver is irregular, being thickest from above downwards upon the right side, and extending in wedge fashion towards the left. It is also thicker posteriorly, and presents in front a thin edge which is marked by a deep notch. The right lower border corresponds with the margin of the ribs, but its position varies to some extent with the movements of the diaphragm, to which the liver is attached by ligaments, formed by folds of the peritoneal covering, which also dips into the fissures. Five fissures on the under surface of the organ divide it into a corresponding number of lobes, and in one of the anterior fissures lies the gall-bladder, a pear-shaped membranous sac about four inches in length and one inch in breadth at its widest part. One of the fissures on the posterior border of the liver is occupied by a portion of the inferior *vena cava*, which receives the blood from the hepatic veins before it passes upwards through the diaphragm. The blood supply of the liver is complicated. Like all other animal tissues, it requires arterial blood. Amongst the functions of the liver are the elaboration and the storing up of certain products of digestion which are brought to it by the portal vein. This large venous trunk is built up by the union of the intestinal veins which contain blood charged with food extractives, and reaching the liver it ramifies like an artery within

the substance of that organ. The liver substance consists of innumerable distinct lobules which longitudinally are oblong, but transversely present a polygonal surface. The liver is plentifully supplied with lymphatics, and with nerves largely derived from the sympathetic system.

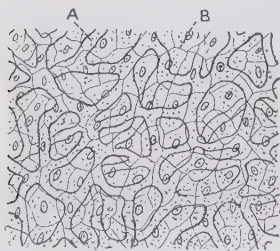
Until comparatively recent years the chief function of the liver was supposed to be the production of bile, the importance of which in the process of digestion was greatly overestimated. Bile



Under Surface of Liver.

A, Right lobe; B, left lobe; C, quadrate lobe; D, caudate lobe; E, Spigelian lobe; F, gall-bladder; G, inferior vena cava; H, portal vein; I, hepatic artery; J, hepatic duct; K, umbilical vein.

is a golden-yellow fluid, intensely bitter in taste, and alkaline in reaction. Bile is now regarded more as an excretion than a secretion, being a by-product formed by the liver cells in the course of manufacture of more important compounds. Receiving as it does the blood from the alimentary canal, the liver subjects the food to a second digestion, and while transmitting through the hepatic veins to the general circulation whatever is required for immediate use, it retains and stores up any surplus, which it subsequently doles out to the tissues as



Cells (A) and Capillary Blood-vessels (B) of Liver.

required. The substance which is thus manufactured and passed on to the blood is a sugar called glucose, and the excess is stored up in the liver cells in the form of glycogen. One more function of the liver is the regulation of the number of red blood corpuscles. During foetal life great numbers of red blood cells are produced in the hepatic capillaries. After birth, however, the liver assumes

the opposite rôle in the economy of the blood, destroying, as it does, the old and effete red corpuscles, whose hæmin and other iron-free pigments it excretes with the bile, the iron of the hæmoglobin being retained for subsequent use.

The commoner diseases of the liver have already been dealt with in the articles JAUNDICE and GALL-STONES, but there remain to be described some pathological conditions in which jaundice may not be a symptom. Of these, cirrhosis in one or other of its forms is the commonest. This disease is due to long-continued irritation of the liver, and is generally associated with spirit-drinking, but a similar condition follows the chronic venous congestion caused by some forms of heart disease. In the later stages of the disease the liver is hardened and greatly decreased in size. The symptoms vary to an extreme degree, even advanced cirrhosis in some cases causing little disturbance. In other cases chronic congestion of the abdominal organs results, bringing in its train intestinal irregularities and hemorrhages, kidney cirrhosis, œdema of the feet and legs, and finally ascites. Should jaundice be present, it is generally only slight. In some cases, more especially when the kidneys also are cirrhotic, cerebral symptoms ensue.

Treatment must be directed towards the relief of symptoms, and if possible the arrest of the process. Total abstinence from alcohol is essential. Diuretics and sharp purgatives help to relieve the engorged abdominal vessels, and in some cases iodide of potassium is useful. Digitalis may also be employed to give tone to the vessels. When ascites develops it is advisable to resort to tapping.

Fatty liver may in drunkards be associated with cirrhosis, or it may be merely a part of a general obesity. From such conditions which are due to infiltration of fat must be distinguished fatty degeneration, which occurs in acute yellow atrophy of the liver, or as a result of certain poisons like phosphorus.

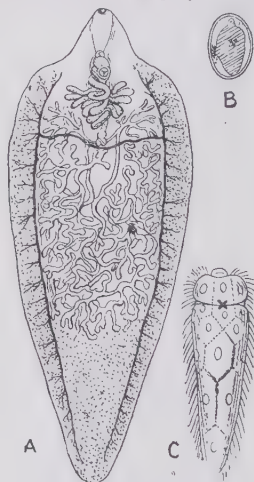
New growths of the liver and bile passages are not infrequent. They may arise primarily, or may be secondary to disease elsewhere. Carcinoma is the commonest form of malignant growth in the liver; sarcomata are also found, but they are usually secondary.

Abscess of the liver is happily rare in this country. When it does occur it is usually the result of pyæmia or of septicæmia. In the tropics solitary liver abscesses are not uncommon as a sequela of dysentery. Such solitary abscesses may become encysted and give rise to little or no further trouble, or they may point and

rupture. Of late years great success has attended the evacuation of liver abscesses by free incision and drainage.

Rupture of the liver sometimes occurs as the result of a blow, and wounds may be caused by bullets or by cutting instruments.

Liver Fluke (*Distomum hepaticum*), a destructive parasite of the sheep, in which it gives rise to the disease known as sheep-rot or liver-rot. The adult fluke is about one inch in length and half an inch in breadth, and is flat, oval, and leaflike. The name *Distomum*, or two mouths, refers to the fact that in addition to the true mouth there is an imperforate sucker, looking like another opening, a short distance behind the mouth. The alimentary system consists of a blind but much-branched gut, and there



Liver Fluke (*Distomum hepaticum*).

A, Fluke; B, ovum, containing a developed embryo; C, free and ciliated embryo.

is a very complex system of reproductive organs. The life history is complex. The adults live in the liver and bile-ducts of the sheep, and their very numerous eggs pass out of the body of the host with the faeces. If they fall on damp ground, the shell which surrounds the egg bursts after a lapse of some weeks, and a little ciliated embryo emerges. This swims about in water for a few hours on the surface of the ground, but dies if within that time it does not come into contact with the little fresh-water snail *Limnaeus truncatulus*. If it meet the snail, it enters its 'lung' or pulmonary chamber, and there becomes converted into a stationary form known as the sporocyst. The sporocyst produces eggs which develop

without previous fertilization into new forms called *rediae*. The *rediae* migrate from the lung to the liver of the snail, and there produce successive generations of *rediae*. Eventually, however, they produce a new form known as the *cercaria*. This has a long tail, two suckers, and a forked food-canal. It wriggles out of the snail, swims through the water by means of its tail, and finally becomes encysted on stems of grass at the margin of the pool. If these cysts be eaten by a sheep, the wall dissolves in the stomach, and the *cercaria* grows into an adult fluke. Effective drainage of the pastures is the best way of keeping down the disease. The parasite is most common in the sheep, but it is also capable of living in oxen and even in man himself. For the allies of the liver fluke, see article TREMATODES.

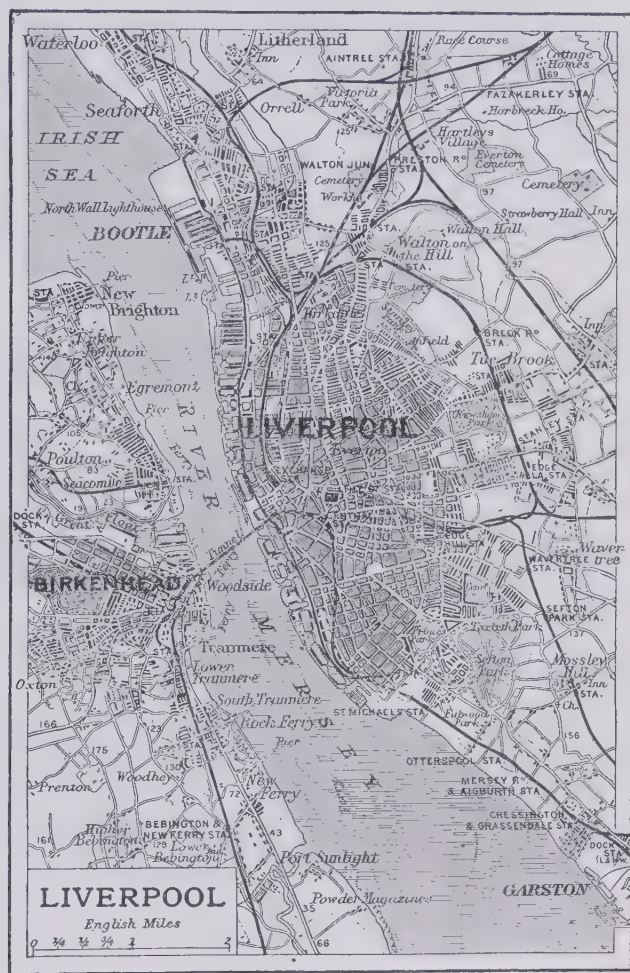
Liver of Sulphur consists chiefly of polysulphides of potassium along with other salts, and is obtained by fusing potassium carbonate with sulphur. It forms a dark-brown mass which blackens silver, and gives off hydrogen sulphide when acted on by the carbon dioxide of the air or other acids. It is used medicinally in ointments to cure scabies and other skin diseases, and to a small extent internally.

Liverpool, parl. and munic. city in the county palatine of Lancaster and the hundred of W. Derby, England. It is situated on the eastern bank of the river Mersey, about 3 m. from the sea. The derivation of the first half of its name is obscure, but *liver* (the bulrush or water-flag) or *lither* (lower) seems the most probable. *Pool* is obviously derived from the sea-lake or inlet of the Mersey, which originally formed the natural boundary of the place on the S. and E. Historically we begin to hear of the town during the Irish wars of Henry II., that king finding it a convenient place for the embarkation of his troops. In 1207, during the reign of King John, the town received its first charter. In the same reign the castle of Liverpool was built. Though it existed some four hundred years, it made no mark in history. After the rebellion Charles II. dismantled it, and in 1725 it was entirely demolished. In 1229 Henry III. granted the town a charter of incorporation, and in it gave powers for the formation of a trades guild. Charles I. sold the manor of Liverpool to certain merchants of London, who reconveyed it in 1632 to Lord Molyneux of Sefton for £450. Ultimately the corporation purchased the reversion of the manor and its rights for £2,250. The growth of

Liverpool and the development of its commerce from this time were so rapid that when Parliament in 1856 deprived the town of its town dues, the corporation received £1,500,000 as compensation.

Originally the port of Liverpool was under the jurisdiction of the customs officials of Chester, but in 1647 a separation took place, and Liverpool became inde-

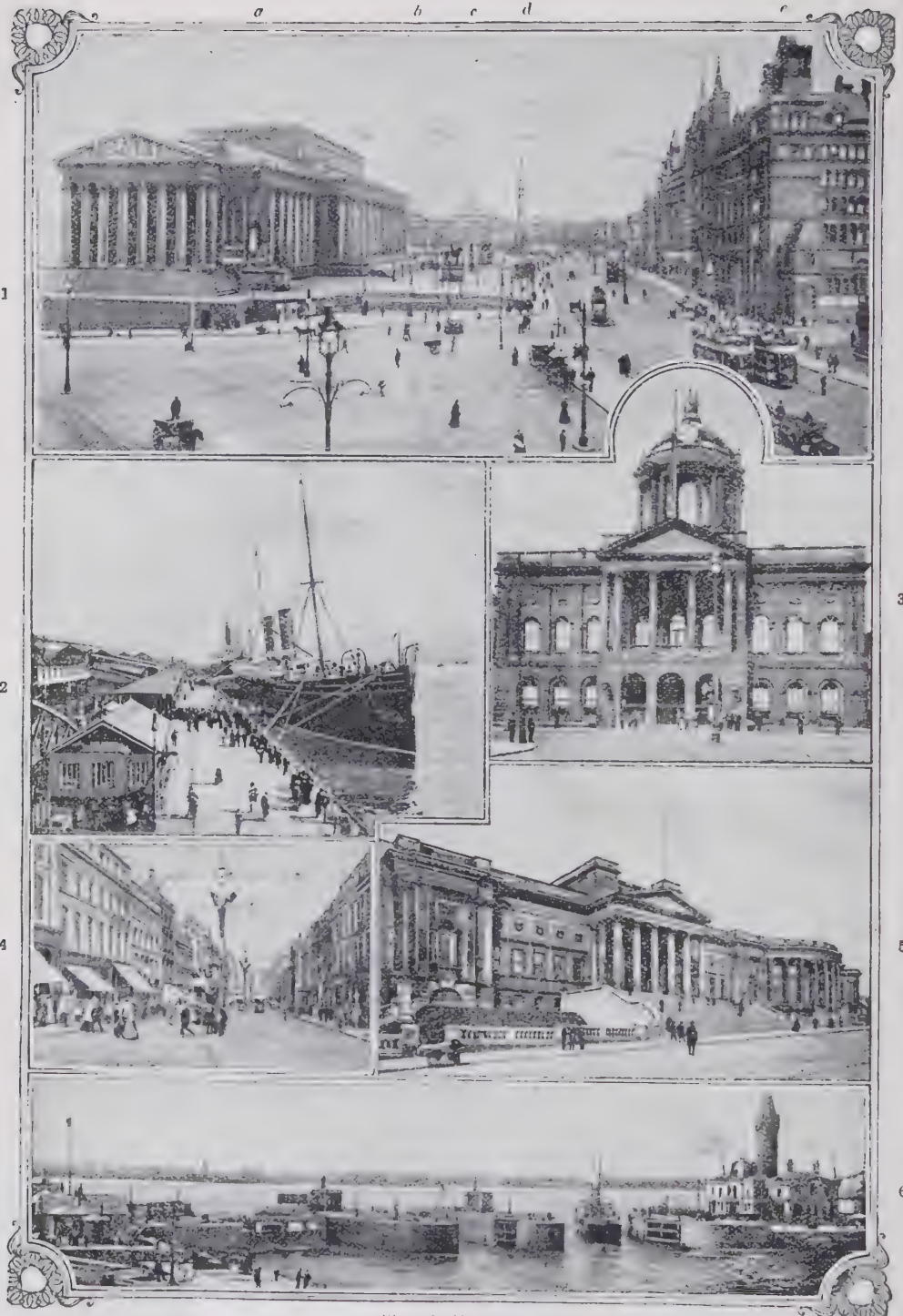
but without much practical result. Under the influence of Dr. Chavasse, the successor to Dr. Ryle, this question was revived, with the result that the site for a cathedral has now been settled upon, plans by Mr. G. Gilbert Scott accepted, and nearly £200,000 of the necessary building fund raised. His Majesty the King laid the foundation stone in 1904.



pendent. With the formation of the parish (1699) the erection of the present pro-cathedral church of St. Peter was begun, and was consecrated five years afterwards. In 1880 the diocese of Liverpool was created out of that of Chester, and Dr. J. C. Ryle became its first bishop. For some years the question of a cathedral for Liverpool had been much discussed,

Liverpool is also a bishopric of the Roman Catholic Church, under the episcopal rule of the Right Rev. Thomas Whiteside, D.D. The various dissenting bodies are strong and influential.

Previous to the opening of the first enclosed dock in 1715, Liverpool shipping had to load and discharge cargo in the open pool. This dock was constructed



Views in Liverpool.

1. St. George's Hall (a), Picton Library (b), Walker Art Gallery (c), and Lime Street Station and Hotel (e). 2. Prince's Landing Stage. 3. Town Hall. 4. Lord Street. 5. Museum, Picton Library, and Walker Art Gallery. 6. Prince's Dock. (Photos 1, 2, 3, 5, and 6 by Brown, Barnes & Bell; 4, by Ward.)

by the engineer Thomas Steers, and was the first dock of its kind, and the precursor of the great system of enclosed docks which have given so great a reputation to Liverpool. Originally the trade of Liverpool was principally with Ireland in flax and linen, cattle, swine, and butter. But with the colonization of N. America and the W. Indies a more varied character was given to it, and its volume greatly increased. Through the development of the cotton and other manufactures of Lancashire, the town generally, as the port of shipment, greatly benefited. In 1801 the population of Liverpool was 77,708; the number of vessels, 5,060; the tonnage, 459,719; and the dock dues paid on it, £28,365. In 1902, a century afterwards, the population was 710,337; the number of vessels, 24,214; and their tonnage, 13,308,305; while the dock dues paid reached £1,130,122.

Some idea of the extent and importance of the trade of Liverpool may be had from the following values of imports and exports in 1904 compared with those of several of the chief seaports:—London, £269,471,757; Liverpool, £262,463,869; Hull, £50,958,123; Glasgow, £34,901,534; Southampton, £29,018,141; Bristol, £14,087,432. The values of some of the principal imports into Liverpool in 1904 were: raw cotton, £42,575,635; wheat, £8,599,999; meat (beef, mutton, bacon, hams), £14,054,188; tobacco, £3,009,131; sugar, £3,465,764. The values of principal exports during the same year were: cotton manufactures, £49,113,552; iron and steel manufactures, £9,321,202; woollen manufactures, £8,452,535; machinery and mill work, £6,229,145.

The following statement by the secretary of the Liverpool Ship-owners' Association presents some striking comparisons:—'The annual average tonnage entered and cleared at Liverpool from and to foreign countries is 9,450,000 tons, and to British possessions 1,980,000 tons—total, 11,430,000 tons. In 1903 the tonnage owned in Liverpool exceeded by more than half a million the tonnage of the German empire; exceeded by a million the tonnage owned by Norway; exceeded by a million and a half the tonnage owned by France; and was nearly three times the oversea tonnage owned by the United States of America.'

The visitor to Liverpool has no more interesting and instructive sight than an inspection of its seven miles of continuous docks and surrounding quays. Though all this is better observed on foot, there is the alternative of a journey by the overhead electric railway. The total area of the dock estate is 1,614 acres, and the quay-

age 36 m. Of this, 506 acres of land and dock space and 9 m. of quayage are in Birkenhead. The great landing stage was constructed in 1847, and enlarged in 1874 and 1897, for the purpose of facilitating the immense passenger traffic by the numerous steamers plying to the Mersey ferries, by the coasting steamers, and by ocean liners.

The University of Liverpool, formerly a constituent college in the Victoria University, Manchester, was incorporated by royal charter on July 15, 1903; and by a special Act of Parliament, Aug. 14, 1903, the powers and property of the University College, Liverpool, were transferred from the Victoria University to the new University of Liverpool: Chancellor, the Earl of Derby; Registrar, Professor P. Hebblethwaite, M.A.; Bursar, the Chevalier Londini, D.C.L. The degrees granted are—Arts, B.A., M.A., LITT.D. (Doctor of Letters); Science, B.SC., M.SC., D.SC.; Engineering, B.ENG., M.ENG., D.ENG.; Law, LL.B., LL.M., LL.D.; Medicine, M.B. and CH.B., M.D. and CH.M.; Dental Surgery, B.D.S. Diplomas are granted in Education, in Public Health (D.P.H.), in Tropical Medicine (D.T.M.), in Veterinary Hygiene (D.V.H.). Certificates are granted in Architecture and in Engineering. The School of Tropical Medicine is governed by a committee representing the university, the Royal Southern Hospital, and the merchants and ship-owners of Liverpool, its main objects being to train medical men in the treatment of tropical diseases, and to encourage research. The Veterinary School forms part of the university. The corporation veterinary hospitals and the public abattoirs are available for instruction. Among the many valuable adjuncts to the university may be mentioned the Tate Library in the Victoria Building (with 50,000 vols.), the museums devoted to archaeology, chemistry, zoology, engineering, botany, anatomy, pathology, materia medica, gynecology, and hygiene. The academic year has three terms—autumn, Lent, and summer. Motto, *Hæc otia studia fovant.*

The corporation of Liverpool entered upon the work of technical education in 1890, under the Technical Education Act of 1889; and the Technical Instruction Committee, besides giving efficient instruction in their great central school, assisted by grants of money all the educational agencies in the city, from the elementary schools to the university. The work of the former Technical Instruction Committee is now absorbed in that of the Education Committee appointed under the

Education Act of 1902. Within its purview is a nautical college for giving instruction of a practical character to officers and men engaged in the mercantile marine. The principal secondary schools of Liverpool are Liverpool College, the Liverpool Institute, St. Francis Xavier Schools, and St. Edward's College (the two latter Roman Catholic). Blackburne House (the college for girls, Grove St.), the Liverpool High School, and the East Liverpool High School, are the principal schools for girls. The Liverpool Institute, together with the Blackburne House Girls' School, and the School of Art, were transferred to the City Council in 1905.

The Liverpool Public Library was established in 1852, under a local act. It contains in its reference department over 131,000 volumes, and is rich in works on the fine arts and on natural history. There are also nine branch lending libraries, which provide another 122,700 volumes for readers. The Public Museum was the outcome of the extensive and important gift of the thirteenth Earl of Derby of the stuffed collection of animals formerly at Knowsley Hall. A few years later additional importance was given to the institution by the no less extensive and important collection of antiquities presented by Joseph Mayer. In 1877 the Walker Art Gallery was presented to the town by Sir A. B. Walker. The annual exhibitions of works by living artists vie in merit and popularity with those of the Royal Academy.

The electric lighting and electric tramway systems of Liverpool are among the largest and most successful undertakings of the kind in Britain. There are numerous parks and public gardens, including, besides the larger parks, some forty recreation grounds and enclosures, comprising altogether some 838 acres. The first public establishment of wash-houses for the poor in England took place in Liverpool on May 28, 1842.

Liverpool is well supplied with water, which is excellent in quality and abundant in quantity. Its main sources of supply are from Rivington (Lancashire) and Vyrnwy (N. Wales).

Amongst architectural features the first place is given to St. George's Hall. This modern basilica is of the Corinthian order of architecture, and possesses a dignity, refinement, and style which makes it one of the finest buildings of the classical Renaissance. The town hall is also in the Classic style, as are most of the public buildings of the city. The municipal offices form imposing buildings in the

Palladian style. Among other important municipal buildings are the library and museum, erected by Sir William Brown; the Picton Reading Room, an extension of the library, erected by the city; the Walker Art Gallery, erected by Sir Andrew B. Walker; the technical schools; the Exchange Buildings, in the style of the Flemish Renaissance; the general post office, Victoria Street; the offices of the Royal Insurance Company; the Bank of Liverpool, Water Street; and Parr's Bank, North and South Wales Bank, and Adelphi Bank, all in Castle Street. Pop. (1901) 684,947. See Troughton's *History of Liverpool from the Earliest Period* (1810), Blower's *The Mersey, Ancient and Modern* (1878), Picton's *Memoirs of Liverpool* (1903), and *Handbook compiled for the Public Health Congress*, ed. by Dr. E. W. Hope (1903).

Liverpool. (1.) Town, and early settlement, electorate Canterbury, on George's R., 22 m. w. of Sydney, N.S.W., Australia, in an agricultural district. Manufactures paper. Pop. 4,000. (2.) L. PLAINS, generally level tract of pastoral country, ten million acres in extent, in the N.E. of New South Wales (co. Buckland), Australia. The Darling R. divides it from the Warrego district. The chief town is Tamworth. (3.) L. RANGE, part of the great Dividing Chain, N.S.W., Australia. Its highest point is Oxley's Peak, 4,500 ft.

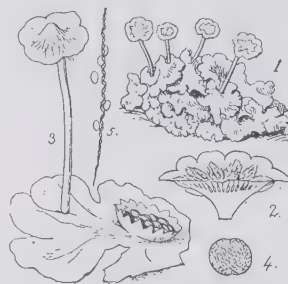
Liverpool, CHARLES JENKINSON, FIRST EARL OF (1727-1808), English statesman. After distinguishing himself at Oxford, he entered Parliament (1761), where he became known as the leader of the 'king's friends.' Secretary of state under Grenville, he was afterwards Secretary for War in Lord North's administration (1778-82), his last important post being the presidency of the Board of Trade, to which he was appointed by Pitt. He was created Earl of Liverpool in 1796. His valuable work, *On the Conduct of Government respecting Neutral Nations* (1758), was translated into several European languages.

Liverpool, ROBERT BANKS JENKINSON, SECOND EARL OF (1770-1828), English statesman, was educated at Charterhouse and Christ Church, Oxford; entered Parliament (1790), afterwards serving as a member of the India Board, and in 1801 became Foreign Secretary under Addington, in which capacity he concluded the treaty of Amiens. He was Home Secretary under Pitt and the Duke of Portland, and Secretary for War and the Colonies under Perceval; he became premier on the assassination of the last named (1812). His

ministry, which lasted until 1827, was an eventful one, covering the crisis of the Napoleonic wars and the subsequent settlement of Europe. He became unpopular through the increased taxes imposed by his ministry, and through the heavy hand with which he put down the frequent riots in which the general discontent found expression. His financial administration was, nevertheless, of value to the country, and his personal sincerity unquestionable. See Yonge's *Life of Second Earl of Liverpool* (1868).

Liverpool Daily Post and Mercury. The *Liverpool Daily Post* came into existence in 1855 with the repeal of the stamp duty. It suffered for a time for its espousal of the cause of the North in the American civil war. It was one of the first newspapers to introduce maps and diagrams, and its parliamentary and commercial intelligence, as well as its literary and dramatic criticism, has always been a feature of the journal. In 1879 the paper changed hands, Mr. Holbrook Gaskell, who had been sole proprietor since 1873, still retaining a large share; and from 1879 till the present time the *Daily Post* has been under the management of Mr. A. G. Jeans. Before this change took place Sir Edward Russell had assumed the editorial chair, which he has since filled with distinction. The *Post* has always been strongly Liberal in politics, and in 1904 it absorbed the *Liverpool Mercury*, another prominent Liberal organ, founded in 1811 by Egerton Smith, and published as a daily newspaper since 1858.

Liversedge, par. and tn., Spen Valley div., W. Riding, Yorkshire, England, 3 m. N.W. of Dewsbury; manufactures woollen and cotton goods, iron, and machinery. Pop. (1901) 13,978.



Liverworts.

1, *Marchantia polymorpha*; 2, receptacle (section); 3, frond with cupule containing bulbils; 4, bulbil; 5, adult elater and spores.

Liverworts, the popular name given to the class of flowerless plants known as Hepaticæ from

the shape of the vegetative parts. They are mostly dwarf plants, closely attached to the surface of damp rocks or wood; but some species are of larger and more erect growth. From the upper surface project minute funnels or stomata, and from the lower surface proceed unicellular rhizoids, which serve for purposes of attachment and absorption. By mere fission, propagation may be effected, as it may also be by means of clusters of gemmæ formed in special receptacles. In addition to these asexual methods of reproduction, male and female organs are borne on the surface of the thallus, and the female cells when fertilized give rise to a sporangium containing spores, from which fresh plants are developed. The orders of liverworts are known as Monocleaceæ, Jungermanniaceæ, Anthocerotaceæ, and Ricciaceæ.

Livery. The word primarily indicated those distinguishing marks on the dress of individuals which marked them out as the adherents of a particular party or service. Liveries were the forerunners of military and 'civil' uniforms; hence the phrases 'the livery of the sovereign,' and 'the livery of the state.' In modern phrase 'livery' is exclusively applied to the dress of servants and dependants, and displays the principal colours of the arms of the employer. The tincture of the field of the coat of arms determines the colour of the coat, and that of the principal charge on the field, the colour of the facings and linings. The buttons on the livery usually show the crest of the family, or any artistic detail from the arms which may appear suitable.

Livery of Seisin. See FEOFFMENT.

Livia Drusilla, the wife of the Emperor Augustus, was the daughter of Livius Drusus Claudianus, and was first married to Tiberius Claudius Nero, by whom she had two sons, Tiberius and Drusus. Augustus compelled her husband to divorce her (38 B.C.) in order that he himself might make her his wife. She had great influence over the emperor, and secured the succession for her son Tiberius. See Baring-Gould's *Tragedy of the Caesars* (1892).

Livingston. (1.) Port in Guatemala, at the mouth of the Rio Dulce. Steamers ply from the town up the Rio Dulce to Izabal (45 m.). Exports coffee and mahogany. Pop. 1,500. (2.) City, Montana, U.S.A., co. seat of Park co., on the Yellowstone R., at an altitude of 4,485 ft. It is the starting-point for tourists to the Yellowstone Park. Lumber mills, lime works, and machine shops. Pop. (1900) 2,778.

Livingston, EDWARD (1764-1836), American jurist and statesman. A republican congressman from 1795-1801, he became in the latter year United States attorney for New York, and mayor of the city. Leaving New York (1803) he built up at New Orleans a great legal practice. A member of the legislature of Louisiana, he prepared a code of criminal law, the excellence of which has been widely recognized. He became secretary of state in 1831, and was subsequently ambassador to France. See his *Criminal Jurisprudence* (1873), and *Life* by Hunt (1864).

Livingston, ROBERT R. (1746-1813), American jurist and statesman, brother of Edward Livingston, was admitted to the bar in 1773. He subsequently sat in the congress which was responsible for the Declaration of Independence, and in 1777 helped to draw up the constitution of New York state, under which he served as chancellor of the state until 1801. At the same time he acted as secretary of foreign affairs (1781-83), and as president of the New York Convention of 1788. As ambassador to France (1801-4) he successfully negotiated the purchase of Louisiana. Livingston was associated with Fulton in furthering steam navigation. See De Peyster's *Biographical Sketch* (1876).

Livingstone, or KING'S MOUNTAINS, a range of highlands in German East Africa, encircling Lake Nyasa on the N. and N.E. Highest peak, Mount Beya, 9,700 ft. On the E. of the lake the Livingstone range extends S. to the valley of the Ruhuhu. The uplands are mostly covered with rich grasses, and the climate is healthy and suitable for European occupation.

Livingstone, DAVID (1813-73), African traveller, born at Blantyre in Scotland. From the age of ten he worked in a cotton factory, at the same time teaching himself Latin and studying natural history. In 1836 he attended the medical class at Anderson College, Glasgow, and lectures at Glasgow University, afterwards receiving the diploma of the Glasgow Faculty of Physicians and Surgeons (1840), in which year he was ordained a missionary by the London Missionary Society, and set sail for the Cape. Settling in Bechuanaland, he married in 1844 Mary, daughter of Dr. Moffat. In 1849 he began his explorations by a journey to Lake Ngami and the Zambezi R., accompanied by Oswell and Murray. Again, in 1852, he reached the Zambezi at Sesheke, ascended the river, crossed the watershed to the Kasai, and arrived at the coast

at Loanda. Retracing his steps to Sesheke, he passed down the river, discovering the Victoria Falls, and came to Quilimane in May 1856. After a visit to England, where various honours were conferred upon him, Livingstone returned to the Zambezi, having severed his connection with the London Missionary Society, and accepted the post of H.M. Consul

of the Rovuma R. and the southern extremity of Lake Nyasa, and across the Loangwa and Chambezi rivers to the southern end of Lake Tanganyika, or, as he called it, Liemba. In the Lofu valley he made the acquaintance of the notorious slave-dealer Tippoo Tib, with whom he travelled to the north-eastern shore of Lake Mweru. He then visited the



Dr. Livingstone, the African Explorer and Missionary.

at Quilimane (1858). From 1858 to 1864 he, with Dr. (afterwards Sir John) Kirk, explored the Zambezi, Shire, and Rovuma rivers, and discovered Lake Nyasa (1859). Returning to England in 1864, Livingstone spent about a year at home, and paid a visit to India before starting on his last journey. In April 1866 he was landed at Mikindani, whence he marched by

chief Kazembe, and discovered Lake Bangweolo (1869), and re-joining the Arabs, crossed Lake Tanganyika, and came to Ujiji. Though suffering severely from illness, he left Ujiji again in July 1869, and after many hardships and dangers struck the Lualaba at Nyangwe. On his return to Ujiji in October 1871, he was, when in great straits, relieved

by Stanley, who had been sent out by the *New York Herald* to find him. Stanley returned to the coast, taking with him Livingstone's journals, while the worn-out traveller marched southwards in 1872, and skirting the south-eastern shore of Tanganyika, struggled on in a dying state till he reached Chitambo's village, south of Lake Bangweolo, where he expired in May 1873. His body was carried by his faithful followers to the coast, and was buried in Westminster Abbey in April 1874. In 1902 a monument was erected on the spot where he died. During his three long journeys Livingstone opened up vast tracts to missionary enterprise and colonization, discovered the lakes Ngami, Nyasa, Shirwa, Bangweolo, and Mweru, and the Lualaba R., the upper course of the Congo, and was the first European to traverse the whole length of Lake Tanganyika. The narrative of his early explorations was given in his *Missionary Travels in South Africa* (1857); of his second journey, in *The Zambesi and its Tributaries* (1865); while his *Last Journals* were edited by the Rev. Horace Waller (1874). See Stanley's *How I Found Livingstone* (1872); Marryat's *David Livingstone* (1877); Mossman's *Livingstone, the Missionary Traveller* (1882); Blaikie's *The Personal Life of David Livingstone* (1884); Johnston's *Livingstone and the Exploration of Central Africa* (1891); Hughes's *David Livingstone* (1889); and Hume's *David Livingstone* (1904).

Livingstonia, mission stn. of the United Free Church of Scotland, Nyasaland, Central Africa, named after Dr. Livingstone. On account of its unhealthy situation it was abandoned in 1883 in favour of Bandawé, on w. shore of the lake.

Livistona, a genus of tropical palms with unarmed stems and terminal, fan-shaped, much-divided leaves. Among the species are *L. chinensis*, which is hardy in some parts of Cornwall, growing to a height of forty feet, and bearing leaves often five feet or more in width; *L. australis*, growing to a height of seventy feet or more; *L. humilis*, and *L. Jenkinsia*, both lower growing species.

Livius, **TITUS**, known as **LIVY** (59 B.C.-17 A.D.), the famous historian of Rome, was born at Patavium (Padua), in N. Italy, but spent most of his time at Rome. The real and only work of his life seems to have been his *History of Rome*, of which the first ten books were almost certainly published by 27 B.C., and which he perhaps had not completed at the time of his death. This great

work contained the history of the Roman state, from the foundation of the city (753 B.C.) to the death of Drusus (9 B.C.), consisting of 142 books, of which only 35 are extant—viz. 1st to 10th, and 21st to 45th; but good epitomes of all the rest, except the 126th and 127th, remain. Of the 35 extant books, several were recovered as late as the 15th and 16th centuries. The first decade brings the history down to 294 B.C.; the extant third, fourth, and half of the fifth decade cover the period from 219 to 167 B.C. As a historian, Livy has always enjoyed a very high reputation; and as far as merely literary excellence goes, he is perhaps unsurpassed among the historians of the world. His great defect as a historian is that he was at no pains to consult original authorities, but depended merely on family legends, or the accounts of previous historians. He also laboured under the disadvantage of being unacquainted with law, the art of warfare, and indeed all practical and active life. Yet his genius as a story-teller has made his work immortal. Livy has been frequently edited, among the earlier editors being Gronovius, Ernesti, and Drakenborch; but the text remained in a corrupt state until the great edition of Madvig and Ussing appeared (1861-6; re-edited 1872-6; 4th ed. 1886), which is the best for the text. Editions with notes: Walker (1797-1813; new ed. 1862), and Weissenborn (1850; 2nd ed. 1856-66). Of individual books: Seeley, bk. i. (1871); Conway, bk. ii. (1901); and Lütkebach, bks. iii.-x. (1891), xxi.-xxiii. (1894), and xxix., xxx. (1893). The old translation of Philemon Holland (1600) is the best in English. A full account of Livy and his works will be found in Hübner's *Grundriss zu Vorlesungen über die Römische Literaturgeschichte* (4th ed. 1878). See also Lachmann's *De Fontibus Historiarum T. Livii* (1822); Taine's *Essai sur Tite Live* (1856; 5th ed. 1888); and Mackail's *Latin Literature* (1895).

Livius Andronicus. See **ANDRONICUS**.

Livny, tn., Orel gov., Central Russia, 80 m. E.S.E. of Orel city, cap. of dist., at junction of Livvenka and Sosna (Don basin). It has trade in grain, flax, cattle, leather. Founded in 1586 as a Russian border fortress against the Tartars, it was the head centre of the rebellion of 1606-13. Pop. (1897) 20,574.

Livonia, **LIVLYANDYA**, **LIVLAND**, or **LIBMAA**, gov. of N.W. Russia, forming one of the three 'Baltic Provinces,' bordered on the N. by Esthonia, on the W. by the Gulf of Riga, on the S. by

Courland, and on the E. by the governments of Vitebsk, Pskov, and St. Petersburg. Including Ėsel and Mohn Is., its area is 18,158 sq. m.; pop. (1897) 1,300,640. Physically, most of Livonia is flat, marshy, or sandy, feebly sprinkled with thin forest or brushwood, enjoying nowhere special fertility. But on the frontiers of Livonia and Esthonia is a considerable plateau-region, with mean altitude of over 420 ft., stretching from Kabbal in the W. to Lake Chudskoe (Peipus) in the E. At the southern extremity these Livonian heights culminate in Munna Mäggi (1,050 ft.). The chief rivers are the W. Dwina, Pernava or Pernau, Aa, and Great Embach. The chief lakes are Chudskoe or Peipus and Wirtz or Wirtz-Järvi, with an area of nearly 150 sq. m. The chief forests lie between the Pernava and the Aa; pines, fir, birches, alders, and oaks are the more common trees. Chief crops: rye, barley, and flax; wheat, oats, and hops are of less importance. The fisheries are abundant and important, and are the chief source of local food. In the forests, elk, wolves, and bears are hunted. Industrially, Livonia now comes seventh among Russian governments; in 1893 it contained 788 industrial establishments, employing over 20,000 workmen, and producing more than £5,000,000 of annual output. The chief manufactures are distilling and sugar-refining; and tobacco, wool, cotton, and linen industries are also valuable. Commerce is very considerable, especially through the ports of Riga, Pernava (Pernau), and Arensburg. In 1895 the different elements of the population were thus estimated—Russians, 78,000; Letts, 552,000; Esthonians, 509,000; Germans, 116,000; Jews, 41,000; Poles, 12,000. The Russian code was introduced (1835), Russian language adopted in law courts and in all public and official acts (1867), the University of Dorpat (Yuriev) Russified, and the old name of the town restored (1889). In the middle of the 12th century Danish merchants first settled near Riga, at the mouth of the Dwina. In 1621 Livonia became Swedish, and was recognized as such by the treaty of Oliva (1660). Peter the Great won it from Sweden early in the 18th century, and the province was recognized as Russian by the treaty of Nystad (1721). Reorganized by Catherine II. (1783) as the 'Government of Riga,' its old name and organization were restored by Paul. Within recent years good railway communications have been provided throughout the government.

Livorno. See **LEGHORN**.

Livre (Lat. *libra*, 'balance,' 'pound'), an old French coin which differed in value according to the place of issue. The most important was the *livre Tournois* (the standard), which was equal to four-fifths of the Paris livre, and stood to the present franc in the ratio of 80 to 81. The livre was superseded by the franc in 1795. See LIRA.

Livy. See LIVIUS.

Lixiviation is the process of extracting the soluble components of a solid mixture by systematic treatment with water or other solvent, the pure solvent coming in contact with the nearly exhausted residue and the

Lizard Head, or LIZARD POINT, promontory with dangerous reef, s. coast of Cornwall, England, 16 m. s.w. of Falmouth, is the most southerly point of Great Britain. There are two fine light-houses (electric light), and the siren fog-signal under the cliffs is said to be the most powerful of its kind. Outward-bound vessels are signalled at the signal station.

Lizards, in the wide sense, are members of the order Lacertilia, which belongs to the sub-class of reptiles known as Sauria, in which are included both lizards and snakes (Ophidia). In lizards, as thus defined, the right and left halves of the lower jaw are

lizard belong to the genus *Lacerta*, which includes the common British viviparous lizard (*L. vivipara*), the sand lizard (*L. agilis*) of Southern England, and the beautiful green lizard (*L. viridis*) of Southern and Central Europe, which touches the British area in the Channel Is. In all these, two pairs of well-developed limbs are present, each furnished with five-clawed digits. The tail is long and very brittle, and the large mouth is placed at the end of the flattened head. The body is covered with pigmented scales, and the lizard shows some power of colour-change. Within the mouth small pointed teeth are



The Lizard Lighthouses, from Lizard Point.

(Photo by Frith.)

solution, as it becomes concentrated, with fresher and fresher material. Important instances of lixiviation are the extraction of carbonate of sodium from 'black ash' (see SODIUM), and of sodium nitrate from the earthy matter with which it is found.

Lixouri, or LIXOURION, seapt., w. of island of Cephalonia, Greece, on Gulf of Argostoli. In the vicinity are the ruins of the ancient Pale. Pop. 5,000.

Lizard, BATTLE OFF THE, fought (June 12, 1652) at the beginning of the first Dutch war, when Sir George Ayscue overtook the Dutch outward-bound E. Indian fleet of forty merchantmen, and secured half a dozen prizes.

connected together by bone instead of merely by an elastic band, as in snakes. Usually, well-developed limbs are present, and also movable eyelids and cutaneous scales; but there are not a few modified and degraded forms in which all these characteristics are lost. Lizards are widely distributed over the globe, especially in the warmer regions. There is much variation in diet, for while the majority live on small insects, some, like the iguanas of America, are purely vegetarian, and others take comparatively large animals, such as frogs, mice, small birds, or are even carrion feeders.

The most familiar forms of

present; the tongue is narrow, flat, and deeply bifurcated. In the viviparous lizard the young burst from the eggs as soon as these are laid; but the other forms deposit their eggs under plants or among weeds, and leave them to hatch in the sun.

In classifying lizards, Gadow recognizes three sub-orders—(1) Geckones, including the curious little geckos; (2) Lacertæ, including all the typical forms; and (3) Chamæleontes, the aberrant chameleons. For other members of the Lacertæ, apart from the species of *Lacerta* noted above, reference should be made to such articles as MONITOR, IGUANA, HELODERMA, and SKINK; while

the geckos and chameleons are discussed under these headings. See Gadow's *Amphibia and Reptiles* (1901) for a comprehensive account of lizards, and Boulenger's *Catalogue of Lizards in the British Museum* (1885-7).

Lizars, JOHN (?1787-1860), Scottish surgeon, born and stud-

operating surgeon in the Royal Infirmary, Edinburgh. Lizars is best known as the author of *A System of Anatomical Plates of the Human Body* (1822).

Ljusne. (1.) River, S. Sweden, rising on the Norwegian border s. of Helagsfjeld, and flowing into the Gulf of Bothnia, below

is recognized by many zoologists as a distinct species (*Auchenia glama*). It is usually white, sometimes white spotted with brown or black, or, more rarely, uniform brown or black. Formerly the males served as pack animals, and the females were kept for their flesh and milk. The llama is a member of the camel family.

Llanberis, vil., Carnarvonshire, Wales, overlooking lakes Padarn and Peris, 7 m. from Carnarvon. Old Llanberis stands at the foot of the pass which divides the Glyders, Y Garn, and the Elidrys from Snowdon peaks. The Dinorwic slate quarries employ 3,000 men. Pop. (1901) 3,015.

Llandaff, city, Glamorganshire, Wales, 2 m. from Cardiff, beautifully situated in the Taff Vale. It is the seat of a bishopric. The cathedral has a square tower of Tudor age, a graceful spire, Norman arches, and rearedos with paintings by Rossetti. Ruins and a castellated gateway of the old episcopal palace remain. Pop. (1901) par. 5,777.

Llandaff, HENRY MATTHEWS, VISCOUNT (1826), English jurist and statesman, was born at Ceylon; admitted as a barrister in 1850, becoming q.c. and a bencher of Lincoln's Inn in 1868. Llandaff sat in the House of Commons as member for Dungarvan (1868-74), also as member for E. Birmingham (1886-95). On the nomination of Lord Randolph Churchill he was made Home Secretary in the second Salisbury administration (1886-92). He was created Viscount Llandaff (1895), and acted as chairman of the Royal Commission on the London Water Supply (1897).

Llandillo, mrkt. tn., Carmarthenshire, Wales, picturesquely situated on the N. bk. of the Towy; has corn and woollen mills, tanneries, and breweries. Carreg Cennen Castle and Dynevor Castle ruins are near. Pop. (1901) 1,934.

Llandoverly, bor. and mrkt. tn., Carmarthenshire, Wales, 18 m. w. by N. of Brecknock, on the Towy. The town has agricultural interests and several breweries. Pop. (1901) 1,809.

Llandrindod Wells, wat.-pl., Radnorshire, Central Wales, on the Ithon, 51 m. s.w. of Shrewsbury, and 750 ft. above sea-level. It has medicinal waters (sulphur, saline, and chalybeate), and is the conference centre for all Welsh associations. Pop. (1901) 1,827.

Llandudno, seaside tn. and summer resort, Carnarvonshire, Wales, on the isthmus between Great and Little Ormes Heads, 3½ m. S. of Conway. Great Ormes Head is of limestone formation, and is surrounded by a marine drive nearly five miles long. Upon it is St. Tudno's



Species of Lizards.

1, 2, 3. *Lacerta muralis*. 4. *Moloch horridus*. 5. *Lacerta viridis*. 6. *Lacerta vivipara*. 7. *Anolis lineatopus*. 8. *Draco volans*. (All half natural size.)

ied at Edinburgh; entered the navy as a surgeon, and saw active service on the Portuguese coast during the Peninsular war. On his return to Edinburgh (1815), he commenced the practice of medicine, and in 1831 became professor of surgery in the Royal College of Surgeons, and senior

Söderhamn, after a course of 240 m. (2.) Seaport, Sweden, prov. Gefleborg, at mouth of above river. Pop. 2,000.

L.L.A., Lady Literate in Arts.

Llama, a domesticated member of the genus *Auchenia*, which, though in all probability descended from the wild guanaco,

ancient church, a cromlech, and lighthouse. On the Conway estuary shore of the isthmus are Deganwy's historic ruined castle and extensive golf links. Pop. (1901) 9,279.

Llanellty, mrkt. tn. and port, Carmarthenshire, Wales, on Burry Inlet, 10½ m. w.n.w. of Swansea. Anthracite and bituminous coal are exported. There are manufactures of tinplates, copper, chemicals, and bricks and tiles; and there are iron foundries, rope works, and breweries. Llanellty has three floating docks and one tidal. Pop. (1901) 25,617 (urb. dist.).

Llanes, seapt., prov. Oviedo,

9 m. s.w. of Wrexham. It has breweries and flannel and woolen factories, and stands in the Vale of Llangollen or Glyndyfrdwr, far famed for its beauty. The town bridge (1345) figures as one of the seven wonders of N. Wales. Plás Newydd was the home of the 'Ladies of Llangollen.' Pop. (1901) 3,303.

Llanidloes, munic. bor., mrkt. tn., and inland resort, Montgomeryshire, Wales, 10 m. from Plinlimmon and the source of the Severn and the Wye; manufactures flannel and iron, has mines of lead, blende, and copper, and exports Welsh mutton. Pop. (1901) 2,769.

grass on which cattle feed—thickly studded with bushes of sweet-smelling chaparral; moriche palms stand like sentries across the plain. The rocky *morros* (hillocks of ironstone outcrops) are overgrown by innumerable creepers, flowering shrubs, and forest trees—*c.g.* the sarrapia, which yields the tonca bean. See Humboldt's *Ansichten der Natur* (1826; trans. 1849); Schomburgk's *Reisen in Britisch-guiana* (1847-8); Sachs's *Aus den Llanos* (1879); Schimper's *Plant-Geography* (1903).

Llanquihue. (1.) Province, S. Chile, bounded by prov. Chiloe on s., Pacific Ocean on w., prov.



Llandudno and Great Ormes Head.

[Photo by Fritz.]

Spain, on N. coast, 45 m. w. of Santander; has fine beaches, and is a celebrated bathing resort. It has a 14th-century Gothic church. Trade in timber, butter, and fish. Pop. (1900) 18,781.

Llanfairfechan, vil. and seaside resort in Carnarvonshire, Wales, 7 m. s.w. of Conway; under Penmaenmawr, and in view of Great Ormes Head and Puffin Isle. Aber Falls are near. Pop. (1901) 2,769.

Llanfair P. G., par., Anglesey, N. Wales, 4 m. from Bangor. Its fame rests upon its polysyllabic name, which in full is *Llanfairpwllgwyngyll*.

Llangollen, mrkt. tn., Denbighshire, Wales, on the Dee,

Llano Estacado (Sp. 'staked plain'), extensive plateau, partly in Texas and partly in New Mexico, U.S.A., separated from the Rocky Mountains in the w. by the valley of the Pecos, and extending E. to form that source of the head-waters of the Red, Brazos, and Colorado Rs.; some of the r. bk. tributaries of the Canadian R. rise on its N. borders.

Llanos, Spanish name for the vast plains of the Orinoco basin. The general characteristics of the Venezuelan llanos are the park-like grass, with clumps of trees and river-fringing woods common to the savanna. The special characteristics are the rich guinea

Valdivia on the N., and Argentina on the E. Area, 45,512 sq. m. Its surface is mountainous, well wooded and well watered. Agriculture is the chief employment, and timber is exported. Chief tn. Puerto Montt, with a well-sheltered harbour on the bay of Reloncavi. Pop. of prov., estimated (1902) 94,850. (2.) Largest lake of Chile, in above prov., on the w. side of the Andes, situated in the great longitudinal valley, 13 m. from Puerto Montt. Area, 225 sq. m. Its depth is considerable, sinking to 350 ft. at a short distance from the shore. Several German colonies are situated round the lake. On the w. rises the volcano Osorno (8,700 ft.).

Llanrwst, mrkt. tn., Denbighshire, Wales, in the beautiful Conway valley, 11 m. s. by E. of Conway. It has tanning, malting, and stocking manufactures. Trefriw has a chalybeate well; Bettwsycoed and Lakes Crafnant and Geirionydd are near. Pop. (1901) 2,645.

Llanthony, ruined monastery, Monmouthshire, England, on riv. Honddu, 9 m. N. of Abergavenny; was founded in 1107. In 1807 the priory became the property of Walter Savage Landor, who farmed it for three years, and thereby incurred financial ruin. The modern abbey, about 4 m. from the ruin, was founded in 1870 by the Rev. Joseph Lyne ('Father Ignatius'). It includes an abbey for monks and a priory for nuns.

LL.B., Bachelor of Laws.

LL.D., Doctor of Laws.

Llerena, tn., prov. Badajoz, Estremadura, Spain, 60 m. N. of Seville, in the midst of a fertile district which produces wheat, wine, and oils. Manufactures soap, linen, and coarse woollens. In the neighbourhood are silver mines. Here, in April 1812, the British defeated the French. Pop. (1897) 6,181.

Llewelyn the Great (d. 1240), Prince of N. Wales, succeeded his uncle, whose territory he usurped (1194). King John helped him to annex S. Wales, and he held the combined tracts as an independent kingdom, but eventually submitted to Henry III. —His grandson, **LLEWELYN AB GRUFFYDD** (d. 1282), succeeded his uncle, David II., in 1246. He revolted from his allegiance to the English (1256), but made peace with Henry III., and ceded the lands east of the Conway. On the accession of Edward I. he refused to do homage; was summoned in 1274, and again in 1276, but refused to appear. His bride, Eleanor de Montfort, was captured by the English (1275) and detained at the English court; and although Llewelyn offered a large ransom for her, it was refused, and war broke out (1276). The English invaded Wales, and forced Llewelyn to sign the treaty of Conway (Nov. 9, 1277). He again revolted in 1282, and was slain in battle the same year.

Llorente, **JUAN ANTONIO** (1756-1823), Spanish historian and reformer. A priest of Calahorra and vicar-general (1782), he changed his religious views and became a liberal reformer within the church (1784). He was appointed secretary-general of the Inquisition (1789), but his advanced views soon compelled his retirement. He was persecuted and disgraced for several years, but was made canon of Toledo (1806). He sided with the

French on the invasion (1808), and was ordered by King Joseph to examine and report upon the archives of the suppressed Inquisition. He accompanied Joseph in his flight to France, and there in exile published his famous *Histoire Critique de l'Inquisition d'Espagne* (1817-18), which brought fresh persecution on him. His *Portraits Politiques des Papes* (1822) caused his expulsion from France, and he died soon after in Madrid. He wrote a great number of historical and polemical works, but lives through his *History of the Inquisition*, a most valuable work, of which editions have appeared in many languages. See his autobiography, *Noticia Biográfica* (1818), *Amador de los Rios*, and *Historia Critica de la Literatura Española* (new ed. 1861-5).

Lloyd, **EDWARD** (1845), English tenor, born in London. He received his musical training in Westminster Abbey choir (1852-60), was afterwards tenor at St. Andrew's, Well Street, and later at the Chapel Royal. In 1867 he began singing at concerts, and four years later had his first great success at Gloucester musical festival in Bach's Passion music. Since 1888 he has been the principal tenor at the Handel festivals.

Lloyd, **WILLIAM WATKINS** (1813-93), English classical and Shakespearean scholar; went into business, and became partner in a London tobacco manufactory, retiring in 1864 to devote himself to study. His principal works are *A History of Sicily to the Athenian War* (1872); *The Age of Pericles* (1875); *The Moses of Michael Angelo* (1863); *Homer, his Age and Art* (1848); and a metrical version of *Much Ado about Nothing* (1884).

Lloyd's is the familiar name employed to designate that great association of marine underwriters in London whose agents are to be found in every port, and whose intelligence stations are dotted over the globe. Towards the end of the 17th century a coffee-house was opened in Tower Street, London, by a Welshman named Edward Lloyd, and here the great institution originated. In 1692 its proprietor sought more ambitious quarters at the corner of Lombard Street and Abchurch Lane, in the very heart of mercantile London. Here, by his enterprise, he began to attract underwriters and shippers as customers in increasing numbers. The fame and popularity of the coffee-house steadily increased. Sales of ships, shipping material, cargoes, and miscellaneous wares were frequent; and it was in those early days that the now historic auction 'pulpit,' which stands in the captains' room at the modern

Lloyd's, was first established. Gradually the transactions at Lloyd's became more and more connected with exclusively maritime business, and especially with marine insurance. Shortly after 1726 *Lloyd's List* (originally established in 1696 as *Lloyd's News*) began to be issued; this contained all the latest news then available of the movements of ships. In 1774 Lloyd's moved into the first floor of the Royal Exchange, where they have remained ever since. In 1779 a most important step was taken in the drawing up of a printed form of marine insurance policy, which, but for the substitution as the opening words of 'Be it known that' for 'In the name of God, amen,' remains the same to this day. The long French war gave a tremendous impetus to the business of Lloyd's, and the risks which its members were able to take and to meet successfully attracted a large marine insurance trade to London from all over the world. It has always maintained a character for generosity and public spirit, and to its initiative are due two great institutions of which this country has every reason to be proud—the Lifeboat Institution and the Patriotic Fund. In 1871 Lloyd's was incorporated by Act of Parliament, but does not as a corporation undertake insurance business. The corporation as such is not responsible for the liabilities of the individual underwriters who compose it, but before election each member has to place security for those liabilities in the hands of the committee. In 1900 there were about six hundred underwriting members, as compared with little over two hundred in 1830. The institution has a most completely equipped system of shipping intelligence all over the world. The offices in the Royal Exchange are provided with the most complete means of affording information to the members and the mercantile community generally as to the movements of shipping, notable among which are a valuable index of vessels, and a register containing an account of the careers of all the captains of the mercantile marine.

Lloyd's Bonds, a form of bond invented by a barrister named Lloyd. They are generally issued by a corporation or company under its seal, admitting indebtedness to the obligee in a certain amount, and promising to pay with interest on a future day. The object was to enable the company to borrow in excess of, but without infringing, its statutory powers. The Railway Regulation Act, 1844, s. 19, unsuccessfully attempted to forbid them (*in re* Cork Railway, L.R., 4 Ch., App. 748).

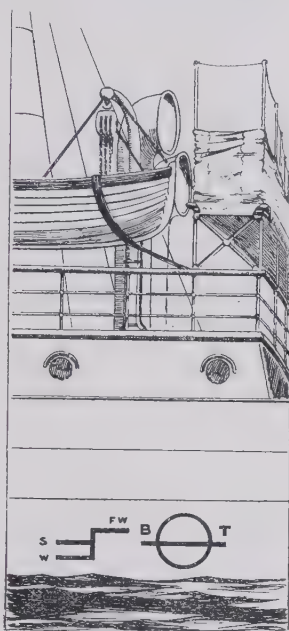
Lloyd's Register of British and Foreign Shipping is a society whose primary object is the classification of vessels. It is managed by a committee composed of merchants, shipowners, and underwriters, elected at the principal ports of the country. To enable a vessel to obtain a class, the plans must be approved by the committee, and the construction must be carried out under the supervision of the society's surveyors, who forward their reports to the committee by whom the class is granted. The highest class assigned to iron and steel vessels is represented by the character 100A1, and that for wooden vessels by A1, A1, etc. It is from this symbol of classification that the popular expression 'A1,' meaning 'first-class,' is derived.

Lloyd's Register maintains a large and highly skilled staff of surveyors at the principal ports of every country. Its authority as a classification society is recognized all over the world. Parliament has entrusted it with the duty of assigning freeboards to vessels, and under the authority of the government it controls the testing of anchors and chains at all the public proving houses in the country. The society issues annually a register book containing very complete information regarding all sea-going vessels whether British or foreign; it also publishes annually a yacht register and a register of American yachts. For a more detailed history of this society, see *Annals of Lloyd's Register* (1884).

Loach, a general name applied to certain small fresh-water fishes allied to the carp, which belong to the sub-family Cobitidæ, of the family Cyprinidæ. All have a small mouth furnished with from six to twelve barbels, and the scales are small or absent. Loaches are confined to Europe and Asia. The European forms usually occur in swift streams with a stony bottom, and are esteemed as food. The common British loach is *Nemachilus barbatulus*. On the continent of Europe occur the giant loach (*Misgurnus fossilis*), which reaches a length of ten inches, and the spiny loach (*Cobitis taenia*), the latter of which also occurs, though rarely, in Britain.

Load-line, a line marked on a vessel, as required by British law, to indicate the maximum depth to which the ship may be immersed by loading. By the Merchant Shipping Act of 1876, mainly due to the efforts of Samuel Plimsoll, a circular disc twelve inches in diameter is to be painted amidships of every British ship, except coasters under eighty tons register, with a line

eighteen inches in length drawn through its centre. This line is the maximum load-line in salt water. By an amending Act of 1890 the centre of the disc was to be placed at such a level as may be approved by the Board of Trade. These tests are repealed and their provisions re-enacted by the Merchant Shipping Act (1894). The question of a *light* load-line, to prevent ships being sent to sea under-ballasted, and thus more liable to be capsized, was the subject of a commission before the House of Lords in 1903;



Load-line on Steamship.

B.T., Board of Trade mark; F.W., fresh-water load-line; S., salt-water summer load-line; W., salt-water winter load-line.

but it was concluded that such a line was unnecessary, in view of the power already lying with the Board of Trade to prevent ships sailing in an unsafe condition. See also **MERCHANT SHIPPING**.

Loan, a contract by which the temporary use of a thing is given by the owner to another person. When the thing lent is transferred to the borrower, to be used by him gratuitously for a definite period and returned without deterioration, this is the contract known in Roman law as *commodatum*, and in Scots law as *commodate*. In English law loan is a form of bailment. The property remains in the owner, though the possession is temporarily transferred. The borrower must take reasonable care, and

return the specified thing lent at the agreed time. If the thing lent is injured or destroyed, without negligence on the part of the borrower, the lender bears the loss. If goods which are consumed in the using are lent for a specified time on an agreement to return their equivalent in quantity and quality at the time fixed, this is the contract of *mutuum*. The property in the goods lent passes to the borrower, and if they are lost or destroyed the borrower bears the loss. When money is lent, interest is not payable if there is no agreement, but under many circumstances an agreement is implied.

Loanda, SÃO PAULO DE, cap. of Portuguese colony of Angola, W. Africa, at the head of a bay 3 m. deep, with an entrance 1½ m. across. The harbour is protected on the N.W. by the low sandy island of Loanda, 7 m. long, which has a population of 1,300, half of them fishermen. The climate is hot and moist and the rainfall light. Loanda exports coffee, india-rubber, wax, rum, and cocoa-nuts. Pop. 24,000.

Loango. (1.) Coast dist., W. Africa, extends 200 m. from mouth of Congo N. to Mayumba; most of it lies within French Congo. Exports palm oil and rubber. (2.) Trading settlement and chief port, French Congo, W. Africa, 100 m. from mouth of Congo R. Exports palm oil, gums, wax, copper, and ivory.

Loans, PUBLIC. See **PUBLIC WORKS LOANS**.

Loan Societies are governed by the Loan Societies Act, 1840, which does not apply to Scotland or Ireland. Any number of persons may form a society for making loans to the industrious classes, not exceeding £15 to any one person. They must frame a set of rules in accordance with the act, approved by the registrar of friendly societies, and enrolled with the county council, and these rules cannot be altered without similar formalities. The property is vested in trustees, and the accounts must be laid before Parliament.

Loasa, a genus mostly of sub-tropical plants, natives of Chile and Peru, belonging to the order Loasaceæ. Nearly all the species are characterized by stinging hairs, and most are climbing or trailing plants. Among the species are *L. prostrata*, a hardy trailing annual plant, bearing yellow flowers in summer; *L. vulcanica*, having white flowers with erect red nectaries; *L. Pentlandii*, with large orange-coloured flowers; and *L. canarioides*, with brick-red flowers, and covered with hairs so poisonous as to make it a dangerous plant to cultivate.

Lobachevsky, NICHOLAS IVANOVITSH (1793-1856), Russian mathematician, born at Nijni Novgorod. From 1816 till 1846 he was professor of mathematics at Kasan. Lobachevsky was the first to publish a non-Euclidian geometry. His works include *Principles of Geometry* (1829-30); *Imaginary Geometry* (1835); *Geometrische Untersuchungen zur Theorie der Parallelimen* (1840; Eng. trans. 1891); *Pangéométrie* (1855). See Vassiliev's *Eloge Historique de Nicolas Lobachevsky* (Eng. trans. 1894).

Lobanoff Rostoffski, PRINCE, ALEXIS BORISSOVITCH (1825-96), Russian statesman, entered the economic department of the Foreign Office at St. Petersburg (1844), becoming first secretary to Count Nesselrode (1847). He was minister to the Sultan (1878), in London (1879), and at Vienna (1882-95). From 1895 till his death he was minister for foreign affairs. His policy was vigorous and high-handed.

Lobau. (1.) Island, Lower Austria, on Danube, $7\frac{1}{2}$ m. below Vienna; utilized by the French as a military base in the war of 1809. (2.) Town, kingdom Saxony, Germany, on riv. Schwarzwasser, 12 m. S.E. of Bautzen; manufactures textiles, buttons, and pianos; has trade in grain and yarns. Pop. (1900) 9,627.

Lobera. See AMADIS OF GAUL. **L'Obel, MATTHIAS DE** (1538-1616), French physician and botanist, born at Lille, who travelled extensively in Europe, and became celebrated for his knowledge of plants. He took charge of Lord Zouche's garden in Hackney, and was appointed botanist to James I. He wrote several works on plants, in Latin, and attempted a scientific classification. Plumier named the *lobelia* after him.

Lobelia, a genus of herbaceous plants belonging to the order Campanulaceæ, bearing racemes of flowers with irregular tubular corollas, the limbs being five-partite, having a bifid upper lip and a trifid lower lip. Among the species in the genus are some of the best blue and scarlet flowering plants of our gardens. *L. cardinalis*, the cardinal flower, and *L. fulgens*, stately North American plants, are valuable herbaceous plants. They grow about two feet in height, have reddish stems and leaves, and in autumn bear flowers of brilliant scarlet. *L. splendens*, a Mexican species, is very similar in habit and colouring. *L. syphilitica* is also a hardy herbaceous perennial, but bears blue flowers. Of the half-hardy and greenhouse species with blue flowers we may name *L. erinus* (a Cape perennial species), *L. coronopifolia*, and *L. anceps*.

Lobengula (1833-94), king of the Matabele, succeeding Moselekatshe as absolute autocrat (1870). In 1893, on account of his repeated raids against the Mashonas, he was attacked by the British, and after severe fighting was defeated. He died shortly afterwards, deserted by his followers.

Lob Nor, or LOP-NOR, lake (mainly fresh water) in the S.E. angle of Chinese Central Asia, to the N. of Altin-tagh (Kuenlun) mountains, lying between 39° and 40° N. and between $88^{\circ} 50'$ and $90^{\circ} 20'$ E., over 2,180 ft. above sea-level. Two lakes were formerly distinguished—(1) Kara-Buran, to the W.; and (2) Kara-Kurchin, Kara-Koshun, or Chonkul, to the E., the name Lob Nor being specially applicable to the latter. Kara-Buran stretched from W. to E., and had a length of 24 m., with extreme breadth of almost 8 m., and depth rarely exceeding $6\frac{1}{2}$ ft. Kara-Kurchin was a reedy marsh, having the form of an ellipse, from S.W. to N.E.: greatest length, over 60 m.; greatest breadth, over 12 m. Except in the southern part, all was covered by thick reeds. It is mostly less than 3 ft. 3 in. in depth. Fish abound, especially salmon and carp. The whole drainage of Chinese Turkestan is received by Lake Lob.

The ancient Lob Nor, mentioned by so many travellers (especially Chinese), is now wholly dried up. It lies to the N. of the present Kara-Koshun, almost exactly at the same level, and is only separated from it by an insignificant rise of ground. Sven Hedin, in 1901, noted the tendency of the lake to return to its ancient bed. Among modern Europeans, the great Russian traveller Prejevalski was the first to visit it and scientifically and adequately describe this remarkable basin (1876-7, 1885). The Lob region has also been minutely studied by Bonvalot, Prince Henri of Orleans (1890-1), Bosdanovitch (1891), Kozlov (1885, 1889, 1894), and Sven Hedin (1896, 1902).

Lobo, JERONIMO (1593-1678), Portuguese missionary, joined the Society of Jesus (1609), and went to India (1621). In 1625 he began his labours as a missionary in Abyssinia. On the expulsion of the missionaries from that country he went back to India, where he became provincial of Goa, returning to Lisbon (1656). His work on Abyssinia was translated in an abridged form by Dr. Johnson (1735).

Lobos Islands, or SEAL ISLANDS, two small groups of rocky islets in the Pacific, some 12 m. off the coast of prov. Lambayeque, Peru, S. America. They have rich deposits of guano.

Lobositz, tn., Bohemia, Austria, on the l. bk. of the Elbe, 53 m. N.W. of Prague; manufactures sugar. Here Frederick the Great defeated the Austrians in 1756. Pop. (1900) 4,581.

Lobsters are long-tailed (macrurus) Crustacea belonging to the order Decapoda and the family Nephropsidæ. They are characterized by the presence of a long beak or rostrum, a sub-cylindrical shell or carapace, and a joint in the outer branch of the last pair of swimmerets. Of all the lobsters, those of greatest



Common Lobster, larval and adult forms.

commercial importance are the common lobster of Europe (*Homarus vulgaris*) and its near ally the American lobster. Both species are large and prolific, but in spite of the enormous number of eggs which are laid, both seem to be diminishing in numbers. The eggs are carried about by the mother until they hatch. When hatched the young are very unlike the mother, but resemble certain shrimplike Crustacea belonging to the genus Mysis, whence they are described as Mysis larvæ. Not until after several moults do they acquire the characters of the adult, and in their young stages they are preyed upon by numerous marine animals. The young are adapted for life in the open water, but the adults haunt rocky coasts, and seem to be relatively sedentary animals. Among other lobsters may be mentioned the Norway lobster, or *Nephrops norvegicus*, which is very abundant on some

parts of the east coast of Britain. It is of an orange-yellow colour, with long, slender forceps, and is a very much smaller species than the common lobster. Allied forms belonging to the genus *Nephrops* occur at great depths, and have rudimentary eyes.

Lob-worm. See LUG-WORM.

Local and Personal Acts.

See ACT OF PARLIAMENT.

Local Government is a term used to indicate all those administrative or even legislative bodies which have been called into existence or utilized to sup-

port function may be carried varies greatly. In all cases it is limited, or should be limited, by the general interests of the nation; and in many cases where devolution is possible, supervision by the central government is highly advantageous—*e.g.* in education.

The distribution of the country into areas suitable for local government is a matter of some importance. A good deal of controversy arose over this point in the discussion of the Education Bill, 1903. It was claimed that the school board areas were in general too small for efficiency; and the county council or city council was substituted as the authority.

The controversy of 1903 was confused by the intrusion of another local government problem—*viz.* that of *ad hoc* electoral bodies. An *ad hoc* body, it was urged, was the only democratic form of government; and it was claimed that there was just as much danger of a congestion of business in a local body as in an imperial parliament—the London County Council being an acknowledged case in point. It was argued, *per contra*, that *ad hoc* bodies had been multiplied unduly in England, and that it was not democratic to give power to bodies which could spend freely, but were under no responsibility for the raising of the money.

For the history of local government, see the article COUNTRY COUNCIL; also Goudy and Smith's *Local Government in Scotland* (1880), Probyn's *Local Government and Taxation* (1882), Sidgwick's *Elements of Politics* (1891), Jenks's *Outline of English Local Government* (1894), and Odger's *Local Government* (English Citizen Series, 1899).

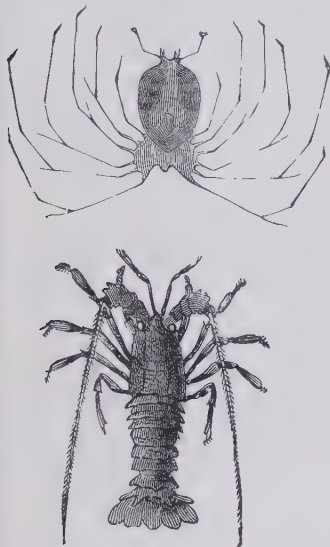
(1.) IN ENGLAND. During the last quarter of the 19th century Parliament devoted a considerable portion of its time to the development of local government in the United Kingdom. The main objects at which the legislation upon this subject has aimed may be said to be increased efficiency in sanitation, simplification and uniformity of areas and jurisdiction, and the creation of a wider franchise in the case of the electors by whom the members of local authorities are selected. From the legislation on this subject within the period in question three acts may be singled out as of capital importance. The Public Health Act, 1875, although amended and added to by many subsequent enactments, is still the foundation of the sanitary law in England. The Local Government Act, 1888, created county councils invested with many of the powers

formerly exercised by the justices of the peace in quarter sessions. The Local Government Act, 1894, created parish councils, and made material alterations in the mode of election and the powers and duties of the sanitary authorities which already existed under the Act of 1875.

The government of the metropolis, although largely affected by the Acts of 1888 and 1894, is not regulated by the Public Health Act of 1875, but by a different series of enactments. It is dealt with separately (see LONDON—Government). The poor law also forms the subject of a separate article, and is only touched upon incidentally here.

Areas of Administration.—The present areas are:—(1) The parish; (2) the urban or rural district; (3) the administrative county. Save in a few exceptional cases, for which special provision has been made, each parish is wholly included in a single urban or rural district, and each such district is included in a single administrative county. The overlapping of jurisdictions is thus avoided. Poor law unions, on the other hand, often extend into more counties than one.

The parish as the unit of local government is distinct from the ecclesiastical parish; it is a purely civil area, and its boundaries are, as a rule, well defined. There are said to be about 15,000 civil parishes in England and Wales, while ecclesiastical parishes number about 13,000. But the number of civil parishes is constantly liable to fluctuation, for county councils have ample powers to divide and combine existing parishes, and thus to create new parishes, making in each case all proper provisions for the local government of the units so created. The Local Government Board have similar powers, and orders of county councils altering parishes require confirmation by that board. Urban districts may be either (a) municipal boroughs, many of them of very ancient origin, many of them created in comparatively recent times by royal charter under the Municipal Corporations Act, 1882, or certain earlier acts; or (b) districts which have been created by special legislation, or by orders of the Local Government Board, or of county councils confirmed by that board. These districts have usually been formed where a part of a rural district, by reason of building operations and consequent increase of population and rateable value, has acquired the character of a town or large village. Since 1894 the correct title of an urban district, other than a borough, has been 'the urban district of . . . in the



Spiny Lobster, larval and adult forms.

plement the work of the central government. Generally speaking, the institutions and organs of local government have been specifically created to exercise their functions; but occasionally a surviving institution has been utilized.

Certain principles seem to have guided governments in their choice of the functions which might be delegated to minor bodies. The first, and perhaps the most important, is to entrust special interests to those specially interested. It is accepted as a maxim, for local taxation at least, that those who benefit should bear the burden.

Secondly, the central government has sometimes found it desirable to promote or permit diversity instead of uniformity of institutions, partly on account of local peculiarities, and partly perhaps with a desire to experiment a little.

The extent to which devolution

county of . . . ;' boroughs retain their distinctive titles, and some are known as cities.

A rural district is the area of a poor law union (or so much of it as is situate in one county), exclusive of any part of it which is included in an urban district. It usually comprises several parishes; but either an urban or a rural district may consist of a single parish, and this is very frequently the case with an urban district.

The administrative county, for which a county council is elected, is not in all cases the same area as the county at large which returns members of Parliament. Each of the three ridings of Yorkshire, and each of the divisions of Sussex, Suffolk, Cambridge, and Northampton, is (under the Act of 1888) a separate administrative county, and the Isle of Wight has been created an administrative county distinct from the administrative county of Southampton. The boundaries of some of the other administrative counties have been altered by orders of the Local Government Board without any corresponding alteration having been made in the boundaries of the parliamentary counties.

Sixty-four of the largest boroughs in England and Wales stand in a somewhat exceptional position. They are known as county boroughs.² Like other boroughs, they are urban districts, and they are also for many purposes administrative counties in themselves, distinct from the residue of the counties in which they respectively lie. Sixty-one county boroughs were created by the Act of 1888; three have been subsequently created.

Parish Meetings.—Every rural parish (*i.e.* every parish in a rural district) has a parish meeting, consisting of the parochial electors of the parish. Registers, or lists, are framed under the acts relating to the registration of electors, containing the names of the parochial electors of each parish, and only the persons whose names appear in these registers or lists are entitled to vote at a parish meeting; their names cannot be inserted in the register unless they are duly qualified (by the ownership or occupation of property) to be registered as parliamentary electors, or as county electors or burgesses. (See ELECTIONS.)

The powers which may be exercised by a parish meeting differ according to whether there is or is not a parish council for the parish. But in all rural parishes the parish meeting has the exclusive power of deciding whether certain acts (sometimes called 'Adoptive Acts') relating to the

lighting of the streets, the provision of libraries, baths, and wash-houses, or a parish burial-ground, shall or shall not be put in force in the parish. Where there is a parish council the councillors are elected by the parochial electors, either by show of hands at a parish meeting, or, if a poll is demanded, then at an election by ballot; and the meeting has the important right of limiting the expenditure of the council to the proceeds of a rate of 3d. in the pound, and of placing a veto upon the raising of a loan by the council. In the small rural parishes in which no parish council exists the parish meeting appoints the overseers of the poor, and the trustees of certain classes of parochial charities, and has certain other minor powers of a parish council.

Parish Councils.—A parish council was created by the Act of 1894 for every rural parish having a population of 300 or upwards at the census of 1891. Parish councils may also be created, by order of the county council, in smaller parishes, and a like order may group two or more parishes under one common parish council. The parish council may consist of from five to fifteen members, as prescribed by the county council; their chairman may be elected as an additional member, or from their own body; the term of office is three years; the election is held in March or April in every third year; the qualification is, being a parochial elector or a certain length of residence in or within three miles of the parish; women, both married and single, are eligible if otherwise qualified. Among the more important of the powers of a parish council are the following: (a) the appointment of overseers; (b) the appointment of trustees of non-ecclesiastical charities in certain cases; (c) the provision of a parish hall or offices, and of a parish recreation ground or public walks; (d) the provision of allotments for the labouring classes; (e) the acquisition of land (for the above purposes) by agreement, or, under a special order of the county council, compulsorily, including, in the case of land for allotments, hiring in lieu of purchase; (f) the execution of any of the Adoptive Acts which may be in force in the parish; (g) the acquisition by agreement of rights of way for the benefit of the parish, and the repair of public footpaths; (h) the utilization of wells or springs for water supply and the suppression of nuisances from offensive ponds or ditches, but not so as to interfere with private rights; (i) making complaint to the county council of the failure of the rural district

council to perform their duty as sanitary or highway authority; (j) to borrow on the credit of the poor rate of the parish, subject to the consent of the parish meeting, the county council, and the Local Government Board. The parish council cannot (apart from expenditure under the Adoptive Acts) expend more than the proceeds of a sixpenny rate, or, without the consent of the parish meeting, more than the proceeds of a threepenny rate. It thus appears that, except where an Adoptive Act is in force, the powers of a parish council are very limited. In many parishes, where allotments have been independently provided and the parish charities are properly administered, there is little to occupy the parish council, and it is often difficult to find a sufficient number of members willing to be elected, or to attend the four meetings which a parish council is bound by law to hold in the course of the year.

District Councils.—Under the Local Government Act, 1894, all existing local boards and Improvement Act Commissioners became urban district councils; the old bodies were thus continued under a new name. This was not so as to the rural authorities: before that act the guardians of the poor of a union were the sanitary authority for the rural part of the union, with the result that guardians elected for urban parishes acted as to sanitary matters with respect to the rural parishes which had no voice in selecting them. To remedy this state of things the act created rural district councils, consisting of councillors elected by rural parishes only; and to avoid multiplicity of elections, it was provided that the councillors elected for a particular rural parish should also represent that parish on the board of guardians. The boards of guardians for a union, and the rural district councils of the rural districts comprised in that union, are thus distinct bodies, although they may have many (in some cases all) of their members in common. The number of members of a district council may be fixed (in the formation of a new district) or varied by the county council; they may elect a chairman from within or without their own body; the term of office is three years; one-third of the members retire in each year, and their places are filled at an annual election, unless an order of the county council or the Local Government Board has provided for triennial retirements and elections. The qualification is, being a parochial elector of a parish within the district or residence in the district (or, in the

case of councillors of a rural district, in the union comprising it) for the twelve months preceding the election, which is held in March or April; the female sex is not a disqualification.

Where an urban district is a borough or city, the urban sanitary authority is the mayor, aldermen, and burgesses (or citizens) acting by the council, and the provisions of the Municipal Corporations Act, 1882, as to election, qualification, etc., apply. The powers and duties of district councils are too numerous to be given in detail in the compass of this article: they include the whole administration of the sanitary law as embodied in the Public Health Act, 1875, and the acts amending the same. These councils are also the highway authorities in respect of all highways, except main roads under the control of the county councils. They have also the duty of protecting public rights of way, and they have powers relating to the regulation of commons and the maintenance of common rights. District councils have large rating powers; their power to borrow upon the security of the rate is subject to certain limitations and to the approval of the Local Government Board. The council of an urban district is often the authority for executing Adoptive Acts within the district; in some cases, however, a separate authority exists for this purpose. In many urban districts the powers of the council have been materially augmented by the provisions of local acts. The powers of an urban are fuller than those of a rural council, particularly as to such matters as sewerage and paving, but the Local Government Board can confer urban powers upon a rural council in respect of particular areas within its district.

County Councils.—County councils were created by the Local Government Act, 1888, as the central administrative authority for a county. A county council consists of a chairman, county aldermen, and councillors; the number of councillors is fixed by the Local Government Board, that of the aldermen is one-third the number of councillors. The qualifications for an alderman or a councillor are similar to those relating to qualifications for the like office in a borough, with the addition of peers owning property in the county, and parliamentary voters registered in respect of ownership of property; a woman is not eligible. The chairman, who corresponds in many respects to the mayor of a borough, may be elected from within or without the council. The term of office is, for a councillor three, for an

alderman six years, and for the chairman one year; at the triennial election all the councillors and half the aldermen retire. The Act of 1888 transferred to county councils the administrative (as distinguished from the judicial) business of the justices in quarter sessions, and a variety of other powers has been conferred upon them by that and other acts. A county council is the authority to fix the county rate; to maintain the county buildings, main roads, bridges, and lunatic asylums; to appoint and pay the salaries of officers such as the county surveyor, treasurer, coroners, and public analysts; and to carry out the acts as to diseases of animals, protection of wild birds, fish conservancy, weights and measures, explosives, reformatory and industrial schools, and the licensing of play-houses. A county council may also make by-laws for the good government of their county and the suppression of nuisances. This enumeration is, however, by no means exhaustive. The powers of a county council to alter existing areas of local government within their county, and to set up new local authorities, and to exercise control in certain respects over district and parish councils, have already been adverted to.

See also, on local government, the titles ELECTIONS, LOCAL GOVERNMENT BOARD, PUBLIC HEALTH. Authorities: Macmoran and Dill on the Local Government Act, 1888, and on the Local Government Act, 1894; Lumley's *Public Health*.

(2.) IN SCOTLAND. For the purposes of local government, Scotland is divided into counties and burghs. There are thirty-three counties. The counties, except the smaller ones, are divided into districts; each district is divided into parishes. Each county has a county council and a standing joint committee. Each district has a district committee. Where the county is not divided into districts the county council acts as district committee. Each parish has a parish council. Each burgh has a town council. In some cases a parish falls partly within a burgh (burghal part), partly without (landward part). Each parish has also a school board. The central authorities are the Local Government Board for Scotland, the Secretary for Scotland, and the Lunacy Board.

County Council.—County councils were first established under the Local Government (Scotland) Act, 1889. The electors are all those registered as parliamentary electors, and all peers and women (married or unmarried) possessing a qualification that, but for the fact of their being peers or

women, would entitle them to be placed on the register of parliamentary electors. The county is divided into electoral divisions, which must be one or other of the following: a parish, two or more parishes, part of a parish, parts of two or more parishes, a parish and part of a parish, a police burgh of less than seven thousand of a population, certain royal burghs. The electors of each division elect one county councillor. The Secretary for Scotland in the first instance determines the number and apportionment of councillors.

The leading powers of the county council are as follows:—They own and maintain roads and bridges; they administer the Contagious Diseases (Animals) Acts, and the Destructive Insects Act, 1877; they have certain regulative powers over the district committees, which execute the Public Health Acts; they must appoint a county medical officer of health and a county sanitary inspector; they are the local authority for the acts relating to gas meters, explosives, weights and measures, habitual drunkards, and wild birds; they appoint visitors to public, private, or district lunatic asylums; they may make by-laws against certain nuisances. They are also the local authority for the administration of the Rivers Pollution Act, under the Secretary for Scotland.

Commissioners of Supply.—Before the establishment of county councils, the commissioners of supply were the chief governing body; they were elected on a property franchise, and must, by the Valuation of Lands (Scotland) Act, 1854, have a certain property qualification. Under the Local Government (Scotland) Act, 1889, they were continued for two purposes—the appointing of members to the standing joint committee (see next paragraph), and a committee for disposal of claims and objections under the provisions of the Commissioners of Supply (Scotland) Act, 1856. Practically, the commissioners have only one function—the appointing of members to the standing joint committee; all their other functions were transferred to the county councils.

Standing Joint Committee for County.—This committee is composed as follows: a number of county councillors (not exceeding seven) appointed annually by the county council in May, a number of commissioners of supply (not exceeding seven) appointed on same day, the sheriff of the county *ex officio*; six members to form a quorum. The standing joint committee is the police committee under the Police Act,

1857, and has charge of the county police. It also controls all capital expenditure in the county. No county council or district committee (see next paragraph) can undertake works involving capital expenditure without the consent in writing of the standing joint committee.

District Committee.—The districts of a county are made up of parishes, or parts of parishes, or other county electoral divisions. The district committee consists of the county councillors for the electoral divisions of the district, and of parish councillors (see below) selected by each parish council in the district. Each parish has thus two representatives on the district committee—one elected by the electors, the other appointed by the parish council. There is also a representative from each burgh within the meaning of the Roads and Bridges (Scotland) Act, 1878.

The district committee is the local authority for the administration of the Public Health Acts in the counties. (See PUBLIC HEALTH.) It must appoint a district medical officer of health and sanitary inspector. These officers may be, and usually are, also county council officers. The district committee has no power of raising money by rate or loan; the county council has this power. Under the county council, the district committee manages the roads and bridges.

Parish Council.—By the Local Government (Scotland) Act, 1894, a parish council was established in every parish. There are in Scotland some nine hundred parishes. The number of councillors in the case of landward parishes is fixed by the county council; in the case of burghal parishes, by the town council; in the case of parishes partly burghal and partly landward, by the county council and town council jointly. If no agreement as to numbers can be come to, the Local Government Board fixes the proportion. The parish councils are thus definitely related to the primary local government bodies—the town council and county council. The franchise is the same for all three councils, and the elections take place on the same day. The election is regulated by the Local Government Board, which may order a new election when the conditions of the act are not fulfilled. The number of parish councillors in any parish cannot be less than five or more than thirty-one.

The primary duty of parish councils is to administer the acts relating to the poor law, the chief act being the Poor Law (Scotland) Amendment Act, 1845. The councils are subject to the

Local Government Board. (See POOR LAW.) They must provide for the maintenance of pauper lunatics having a settlement in the parish. They also administer the Vaccination (Scotland) Act, 1863. They must appoint a vaccinator for the vaccination of defaulters. They levy the school rate under the Education (Scotland) Acts. They make returns under the Local Taxation (Scotland) Returns Act. They have also certain duties under the Local Government (Scotland) Act, 1889, in distributing sums for poor law medical relief and sick-nursing. Further, under the Prevention of Cruelty to Children Act, 1894, they must provide for the reception of children. They appoint the registrars of births, marriages, and deaths. They have powers dealing with burial-grounds. They have power to make representations to the district committee or the county council regarding rights of way, erection of sign-posts and direction notices, formation of special lighting or scavenging districts, provision of public baths. There are other minor powers and duties.

To sum up, a county is managed by three bodies—the county council, the district committee (or council), the parish council; and these three are related to each other, to the burghs, to the Local Government Board, and to the Secretary for Scotland.

Town Council.—Town council is the name given to the governing body of any burgh, including a royal burgh, parliamentary burgh, burgh incorporated by Act of Parliament, police burgh, and any other burgh within the meaning of the Burgh Police (Scotland) Act, 1892. These terms indicate the various forms of burgh, but the organization in all is substantially the same. The town council consists of provost, magistrates, and councillors.

They are elected on the same franchise as the parish council of a burgh. They hold office for three years. The number of members in a town council is fixed according to a scale of population. A town of less than ten thousand inhabitants has a council of nine members, including three magistrates, of whom the provost is chief; a town of from two hundred thousand to five hundred thousand has seventy-five councillors, including twelve magistrates; and a town of over half a million has ninety councillors, including fifteen magistrates. Glasgow is the only Scottish town with over half a million inhabitants. For voting purposes, the burgh is divided into wards, each ward having an allocated number of representa-

tives. The provost and magistrates are elected by the councillors from among themselves. The town council appoints a town clerk, a town clerk depute, a treasurer and collector, surveyor and master of works, medical officer, sanitary inspector, inspector of cleaning, chief constable, and many other officers permanent or temporary.

The town council is the local authority for public health, and as such administers the public health and related statutes. It controls the police, except in small burghs, where the police are under the control of the standing joint committee of the county. It regulates streets, buildings, sewers. It may own gas works, water works, public baths, tramways, electric-light works, public parks, and the like. It regulates lighting, cleaning, sanitation, slaughter-houses and abattoirs. It is local authority for the Contagious Diseases (Animals) Acts. It has powers of assessing and borrowing for all these objects. The magistrates are the immediate licensing authority. In many towns they form the Dean of Guild Court or building committee. They are the police court for trial of minor offences. The town council may make by-laws for a great many purposes; such by-laws, as a rule, require the sanction of the sheriff of the county, or some central authority—the Local Government Board or the Secretary for Scotland. There are many other powers and duties. The principal statutes affecting town councils are the Burgh Police (Scotland) Acts, 1892 and 1903, and the Town Councils (Scotland) Acts, 1900 and 1903. Many burghs are regulated by special acts of Parliament. See LOCAL GOVERNMENT BOARD and SECRETARY FOR SCOTLAND; also *The Councillor's Manual*, by Abijah Murray (7th ed. 1905); *Parish Council Guide for Scotland*, by J. Patten Macdougall and J. M. Dodds (1894); *Local Government in Scotland*, by Mabel Atkinson (1904).

(3.) IN IRELAND as it now exists is the result of a long and complicated history. The governing bodies are county councils, district councils, borough councils, joint committees of county councils and infirmaries or fever hospital managers, boards of guardians. The central authorities are the Local Government Board and the Lord-Lieutenant in council.

County councils are elected by the parliamentary electors and 'those persons who, but for being peers or women, or being registered as parliamentary electors elsewhere, would be entitled to be entered on the parliamentary

register.' This is also the franchise for district councils and boards of guardians. In Ireland there are thirty-three county councils, exclusive of the six county boroughs—Dublin, Belfast, Cork, Londonderry, Waterford, and Limerick. The county councils manage the roads and bridges; subject to the Local Government Board, they approve of the road expenditure of the district councils; they are responsible for the care of the lunatic poor in the county; they contribute to county infirmaries and fever hospitals, and have a share in the management, having representatives on the joint committees; they have certain powers in connection with railway, tramway, and harbour guarantees; they have the administration of technical education along with the district councils; they have power to arrange with the reformatory and industrial school managers for the reception of children.

District councils, as indicated above, are elected on the same franchise as county councils. There are ninety urban district councils, including the county boroughs named and other boroughs. There are twenty-nine small towns with a separate municipal organization, but for some purposes these form part of the rural districts. There are two hundred and thirteen rural districts, each with a district council. The chief work of the district councils is the administration of the Public Health Acts and the maintenance of the part of a main road within their district. The district councils have also certain powers to provide house accommodation and allotments under the Labourers (Ireland) Acts.

Borough or urban district councils have, within the borough area, the same powers as the district councils and county councils in the rural areas. The chief difference between the county boroughs and other urban boroughs is that the county boroughs have entire control of the roads within their area, while, for the rest of Ireland, the county councils have the power to determine the main roads, one half of the expense coming off the whole county, and the other half off the urban and rural districts in which the road is situated. The powers of boroughs in general are much the same as in Scotland and England.

Boards of guardians have as their main duty the administration of the poor law. There are one hundred and fifty-nine unions in Ireland, and each union has its board of guardians. For electoral purposes, the union is divided into electoral divisions, of which there

are some three thousand four hundred and thirty-eight. The guardians may administer indoor relief in workhouses or give outdoor relief. Each union has a workhouse and workhouse infirmary. This is distinct from the county infirmaries, which are maintained partly by voluntary contributions, partly by county rates. The guardians administer the vaccination law. They have charge of the union dispensaries and medical charities. There are no such dispensaries in Scotland. They have certain powers of supplying seed potatoes and of assisting emigration. They are subject to the control of the Local Government Board, which in certain circumstances may dissolve a board of guardians and appoint paid officers to discharge the duties. During the famine years of 1847-9 this power was exercised thirty-eight times. 'The last occasion on which a board of guardians was dissolved was in October 1898. From October 1898 to January 1899 the business of the Clogher Union was administered by paid officers.' The authorized inspectors of the Local Government Board may attend meetings of the guardians and supervise the administration of relief. No 'minister of religion' can become a guardian. The appointment of union officers is subject to the approval of the Local Government Board, which has also powers to form new unions.

See *Royal Commission on Local Taxation* (Final Report, Ireland, 1902, appendix). The quotations are from the appendix, which contains a good *résumé* of the growth of local government in Ireland from the Union on to the great Act of 1898.

Local Government Board. In England this department of the government was established by an act of 1871, which transferred to it all the powers of the Poor Law Board of 1834, and certain powers relating to local government previously exercised by the Home Secretary and the Privy Council. The board consists of a president (always a member of the government, and generally a cabinet minister) and of certain *ex officio* members—viz. the Lord President of the Council, the principal secretaries of state, the Lord Privy Seal, and the Chancellor of the Exchequer. There are also a parliamentary secretary, a permanent secretary, a legal adviser, and a large staff of assistant secretaries, medical officers, inspectors, auditors, clerks, and other officials. The board has large powers conferred by numerous statutes relating to the relief of the poor, local government, and public health.

The Local Government Board for Scotland was created by the Local Government (Scotland) Act, 1894, and succeeded to the powers and duties of the Board of Supervision, abolished by the act. The board consists of the Secretary for Scotland (who is president), the solicitor-general for Scotland, the under-secretary for Scotland, a vice-president, a legal member, who must be an advocate of at least seven years' standing, and a medical practitioner, specially qualified in sanitary science, or who has had five years' experience as medical officer of health of a county or burgh. The last three members are paid. The offices of the Board are in Edinburgh, and it is the central authority for local government in Scotland.

The Local Government Board for Ireland was created by the Local Governments Board (Ireland) Act, 1872, and succeeded to the powers of the Poor Law Commissioners abolished by that act, and to certain powers of the lord-lieutenant, the Privy Council, and the chief-secretary to the lord-lieutenant, conferred by the enactments mentioned in the schedule to the act. The board consists of the chief-secretary and the under-secretary to the lord-lieutenant, together with a vice-president and two other members, one of whom must be a specially qualified medical practitioner.

In Scotland and Ireland, but not in England, a medical practitioner is a member of the board, and thus shares in the executive responsibility. In England the medical department is essentially advisory, and has no independent executive powers.

For fuller information as to the powers and duties of the Local Government Boards of England, Scotland, and Ireland, see articles on LOCAL GOVERNMENT, LONDON—Government, POOR LAW, PROVISIONAL ORDERS, and PUBLIC HEALTH, and the authorities there referred to.

Local Marine Board. See MERCHANT SHIPPING.

Local Option. or **LOCAL VETO**, is the phrase which embodies one of the principal objects of the United Kingdom Alliance, presided over by Sir Wilfrid Lawson, who has been its sponsor and advocate in the House of Commons for a quarter of a century, and has induced the Liberal party to include it among the items of its programme. What exactly is meant by the phrase was explained by Sir Wilfrid Lawson on June 18, 1880, when, for the second time within the space of three months, he proposed his local veto resolution. The reso-

lution itself was in these terms: 'That, inasmuch as the ancient and avowed object of licensing the sale of intoxicating liquors is to supply a supposed public want without detriment to the public welfare, this house is of opinion that a legal power of restraining the issue or renewal of licences should be placed in the hands of the persons most deeply interested and affected—*viz.* the inhabitants themselves, who are entitled to protection from the injurious consequences of the present system by some efficient measure of local option.' Sir Wilfrid Lawson then stated that 'all I propose is that the people for whom these places are licensed, the inhabitants for whose benefit they are set up, shall be allowed to say whether they will have them or not. That explains the meaning of the word "option." "Local" means that there should be a certain district marked out in which the inhabitants should be allowed to exercise their option.' The resolution was carried on that occasion by a majority of twenty-six. A similar motion was approved of by the House of Commons on June 14, 1881, by a majority of forty-two; and again on April 27, 1883, by a majority of eighty-seven. It was rejected, however, when moved on April 29, 1891. No legislative result has yet been achieved (1905). Local option in one form or another prevails in most of the British colonies. See LIQUOR LAWS.

Local Rank, military, may be conferred on any officer in order to enable him to undertake more responsible duties, and to give him the necessary seniority over those who come under his command. Local rank only holds good in the district for which it is granted. It carries with it pay of the higher rank.

Local Taxation Grants, grants made out of the imperial exchequer in aid of local taxation. They fall under three heads. (1.) *The Probate Duty Grant*. Till 1894 this consisted of one-half of the sum paid as probate duty. The Finance Act, 1894, abolished probate duty, but, by sec. 19, it directed an equivalent amount to be paid out of the estate duty charged under that act—*i.e.* one and a half per cent. on all property formerly chargeable with probate duty. Four-fifths of this grant is paid to county councils in England and Wales, to be applied for various purposes directed by the Local Government Act, 1888. Eleven-twentieths of the remaining one-fifth is paid to the Local Taxation (Scotland) Account, and applied under the directions of the Secretary for Scotland for the

purposes mentioned in sec. 20 of the Local Government (Scotland) Act, 1889, and nine-twentieths is paid to the Guarantee Fund under the purchase of Land (Ireland) Act, 1891. (2.) *The Customs and Excise Duty Grant*. This is a duty of 6d. per gallon on spirits and 3d. per 36 gallons on beer. It is directed by the Customs and Inland Revenue Act, 1890, to be divided between England, Scotland, and Ireland in the same proportions, and paid to the same accounts as the probate duty; and an act of the same session (c. 60) provides for the distribution and application of it. (3.) *The Local Taxation Licences Grant*. This consists of the proceeds of licences for the sale of intoxicating liquors, for dealing in game or tobacco, for keeping dogs, carriages, or men-servants, using armorial bearings, carrying a gun, or killing game, or carrying on the business of a pawnbroker, auctioneer, appraiser, house-agent, plate dealer, hawker, etc. In England and Wales the proceeds of these licences in each county are paid to the county council, and in Scotland to the Local Taxation (Scotland) Account, to be applied in each case in the same way as the probate duty grant. In Ireland, under the Local Government (Ireland) Act, 1898, a sum is paid out of the Consolidated Fund to the Local Taxation (Ireland) Account equal to the amount derived from similar licences in Ireland, and is applicable to the various purposes mentioned in sec. 58 of the act.

Local Taxation Returns. By the Local Taxation Returns Act, 1860, the clerks of all local authorities in England empowered to levy rates were required to make annual returns to a secretary of state as to the amount and expenditure of the rates levied. Additional returns were required by later enactments, and since 1877 they are all sent to the Local Government Board, where an abstract of them is prepared which is annually laid before Parliament. Similar returns are made in Scotland to the Secretary for Scotland, under Acts of 1881 and 1888, and abstracts of them are also laid before Parliament.

Locarno, tn., canton Ticino, Switzerland, at mouth of riv. Maggia, 10 m. s.w. of Bellinzona, on upper end of Lake Maggiore. It contains the pilgrimage church of Madonna del Sasso. Pop. 3,200.

Loc. cit., *loco citato*—*i.e.* 'in the place quoted.'

Loch, HENRY BROUGHAM, FIRST BARON LOCH (1827-1900), British administrator; was Lord Gough's aide-de-camp in the Sutlej campaign (1846); served in the Crimea (1854); went on the embassy to

China (1857-60); and was private secretary to Lord Elgin (1860). After the surrender of the Taku forts he was seized by the Chinese officials, imprisoned, and tortured. He returned to England in charge of the Tientsin treaty (1860). He was governor of the Isle of Man (1863-82), of Victoria (1884-9), and of the Cape (1889-95). He wrote an account of Lord Elgin's second embassy to China (1869). He was raised to the peerage (1895).

Lochaber, dist., Invernesshire, Scotland, bounded by Lochs Leven, Linnhe, and Gil. The district abounds in wild glens, broad moors, and lofty mountains. 'Farewell to Lochaber' forms the subject of one of Allan Ramsay's songs.

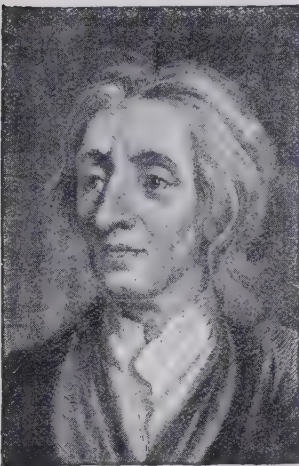
Loches (anc. *Leuce*), tn., dep. Indre-et-Loire, France, on the l. bk. of the riv. Indre, 23 m. s.e. of Tours; has a famous castle, built by Charles VII., which was converted into a state prison during the reign of Louis XI. The town has tanneries, and trades in agricultural products. Pop. (1901) 5,161.

Lochgelly, pol. bur. of Auchterderran par., S.W. Fifeshire, Scotland, $7\frac{1}{2}$ m. n.e. of Dunfermline; has extensive collieries and iron works. Pop. (1901) 5,472.

Lochleven. See LEVEN, LOCH. **Lochmaben**, parl. and roy. bur. and par., Annandale, Dumfriesshire, Scotland, near the Annan, 10 m. n.e. of Dumfries. In the Castle Loch, 1 m. s.e., are the ruins of Lochmaben Castle, formerly the seat of the Bruces. Pop. (1901) 1,051.

Locke, JOHN (1632-1704), the parent and representative of English philosophical thought in the 18th century, was born at Wrington, in Somersetshire. Something that helps to explain Locke can be traced to his parentage. In Elizabeth's reign his grandfather, a prosperous Puritan trader, migrated from Dorset into Somerset, where he bought the little property of Belton, six miles south-east of Bristol. This was the early home of his grandson, the philosopher. Before the future philosopher's childhood was ended, his mother died, 'a very pious woman and affectionate'; and then his father, mentioned as 'a man of parts,' directed the home-training of the son, often interrupted in those troubled years by the father's duties as a captain in the parliamentary army. The desultory home-training at Belton was followed in 1646 by six years at Westminster School, at that time under Puritan control. In 1652 Locke moved from Westminster to Oxford, and entered Christ Church.

It was at Oxford that Locke was directed to his life-work. A disposition at once metaphysical and religious had attracted him to theology, but a growing taste for experiment in nature engaged him in the end in physical research and the study of medicine, and before 1666 he engaged in medical practice. In 1667 Lord Ashley (soon after the first Earl of Shaftesbury, the brilliant statesman of Charles II.'s reign) happened to visit Oxford, and was so charmed by young Locke, to whose medical care he had been entrusted, that 'he desired him to look upon his house in London as thereafter his home.' Accordingly, in 1668, Locke exchanged Christ Church for Exeter House in the Strand, and while he retained his studentship at Oxford, and had inherited Beluton from his father, he shared for-



John Locke.

tune during the fourteen following years with the famous English statesman.

Locke's new duties were congenial to his taste and attainments. Life at Exeter House trained him practically in public affairs, and opened personal intercourse with those who were at the springs of political action. In 1672 he was made secretary of the Board of Trade under Lord Shaftesbury, in which office, with Exeter House for his home, he worked with 'singular exactness' till 1675, when Shaftesbury quarrelled with the court, resigned high office, and joined the 'Country Party.' Thus relieved of official cares, Locke retired for four years to France, where, at Montpellier and in Paris, he availed himself of this signal opportunity for prosecuting a work he had lately contemplated.

It was then that the chief enterprise of his life took shape, in the form of the *Essay concerning Human Understanding*, published fifteen years later. In 1679 he returned to London, and resumed his place in Shaftesbury's household, now at Thanet House in Aldersgate Street.

Locke's movements in England for the next few years are obscure. He was unjustly suspected of treason on account of his relations with Shaftesbury. Before the end of 1683 he was an exile in Holland, then the European asylum of those who failed to secure intellectual liberty elsewhere.

In 1688 the course of English politics opened Locke's way back to England. He returned to begin his life of authorship—for him a new career. His first appearance took the form of a characteristic *Letter for Toleration*, prepared in Holland, and published anonymously at Gouda in 1689—a philosophical argument in favour of freedom of thought addressed to his friend Limborch. An English translation appeared soon after in London, which occasioned controversy, and drew from Locke a *Second Letter for Toleration* in 1690. In the same year he published *An Essay on Civil Government*, in vindication of the principles of the revolution, which has been considered by a high authority as the most important contribution ever made to English constitutional law by an author who was not a lawyer by profession. But 1690 is chiefly memorable in Locke's history for the publication of the famous *Essay concerning Human Understanding*. He got £30 for the copyright. A like sum was given to Kant ninety-one years after for his *Kritik*, the philosophical complement to this *Essay* of Locke. The *Essay* and the *Kritik* are the chief springs of all later philosophy. The one, with its critical individualism and empiricism, dominates in the 18th century; and the other, with its critical idealism, inaugurates the dominant thinking of the 19th. Animated by the modern spirit, Locke saw in 'experience' the measure of human knowledge of the realities amidst which man finds himself. 'Let us,' he says, 'suppose the mind to be white paper, without any ideas. Whence has it all the materials of reason and knowledge? To this I answer in one word—from experience. Our observation, employed either about external sensible objects, or about the internal operations of our minds, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge.' The epoch-making *Essay*

is an expansion of this somewhat ambiguous announcement. For 'observation' only presents isolated facts in their separation and differences, not the organic unity which knowledge implies. Unless man tacitly presupposes the rational or divine constitution of experience, isolated data inevitably dissolve in universal nescience. Nevertheless, Locke tacitly recognized synthetic reason in the heart of experience. There are spiritual elements dimly present in the *Essay*, of which some who claimed it as their guide took no account. As interpreted by Condillac and the French Encyclopaedists, the *Essay* resolves into materialism; and Hume, interpreting Locke's 'experience' as fundamentally accidental association of transitory phenomena, reduced so-called 'human knowledge' to the isolated feelings of successive moments, so that he was 'unable to look upon any opinion on any subject as more probable than another,' 'utterly deprived' by his philosophy 'of the use of every member and faculty.' On the other hand, Berkeley's theistic conception of the universe, which sees active intelligence inevitably at the root of all the data of experience in sense, is an outcome from the *Essay* of Locke in an opposite direction. But it was Kant who so investigated the intellectual presuppositions that are tacitly involved in experience as to articulate the contents of reason that necessarily underlies experience, thus supplementing the work of Locke. The critical analysis of our knowledge, initiated by Locke and elaborated by Kant, is, in its consequences, the most important philosophical step in advance made by modern thought; it has opened the way to our present theological and philosophical attitude. The *Essay* secured an extraordinary popularity, unprecedented in the case of a philosophical treatise.

In 1691 two winters of authorship in London had aggravated Locke's chronic ailments. It was then that a rural home in the secluded manor-house of Otes in Essex opened to receive him. It was the country house of Sir Thomas Masham and Lady Masham, the accomplished daughter of Cudworth, with whose family Locke was intimate before his exile in Holland. Here he lived as a member of the Masham family during the fourteen remaining years of his life, with as much domestic happiness and literary opportunity as was consistent with broken health and occasional official visits to London—for in 1696 he was made a commissioner of trade, 'a very honourable employment, with £1,000

a year of salary annexed.' A *Third Letter for Toleration* (1692); *Thoughts concerning Education* (1693); an amended edition of the *Essay* (1694), followed by a third in 1695; financial tracts on the *Rate of Interest* (1691) and on the *Coining of Silver* (1695); an *Essay on the Reasonableness of Christianity* (1695), followed by *Vindications* of the same against hostile critics (1695); three elaborate *Letters* in controversy with Bishop Stillingfleet concerning doubtful passages in the *Essay on Human Understanding* (1697-9); and a fourth edition of the *Essay*, further amended, in 1700, all bear testimony to the busy mind at work at Otes.

The last four years of Locke's life were largely devoted to exegetical annotation of the *Epistles of St. Paul*, in which he applied the liberal principles of his *Essay* to the interpretation of records which he revered in the spirit of the Puritanism of his youth, now enlightened by more comprehensive vision. The commentaries were given to the world soon after his death. In 1706 a volume of posthumous works appeared, followed in 1720 by another edited by De Maisieux.

Many collected editions of Locke's *Works* (which first appeared in 1704) have been published, the best that of Bishop Law (4 vols. 1777). There are some forty editions of the *Essay*, the latest edition being Professor Campbell Fraser's, with notes and prolegomena (1894). It was translated into French (1700), and into Latin (1701). See Leibniz's *Nouveaux Essais* (1765); Leclerc's *Eloge Historique* (1710); Dugald Stewart's *Philosophical Essays* (1810); Lord King's *Life of John Locke* (1829); Schärer's *John Locke* (1860); Cousin's *La Philosophie de Locke* (1861); Fox Bourne's *Life of Locke* (1876); Fowler's *Locke*, in *English Men of Letters* (1880); Fraser's *Locke*, in *Philosophical Classics* (1890); Hertling's *John Locke und die Schule von Cambridge* (1892); and Martin's *Die Logik John Lockes* (1894).

Lockerbie, mkt. tn., Annandale, Dumfriesshire, Scotland, 12 m. E. of Dumfries. The largest lamb fair in Scotland is held here every year in August. An ancient square tower, formerly the seat of the Johnstones, now forms part of the police station. Pop. (1901) 2,353.

Locker-Lampson, FREDERICK (1821-95), English poet; served for some years in Somerset House and at the Admiralty, until his health broke down in 1849. In 1857 he published a volume of original verse, under the title of *London Lyrics*, which appeared in a great variety of editions be-

tween that year and 1893. His other publications were two anthologies, *Lyra Elegantiarum* (1867) and *Patchwork* (1879); an autobiography posthumously published as *My Confidences* (1896); and a catalogue of the valuable library at Rowfant, where he resided for the last twenty years of his life. His original verse is neat and finished in style, and his literary taste was excellent.

Lockhart, JOHN GIBSON (1794-1854), biographer of Sir Walter Scott, born at Cambusnethan; educated at Glasgow and Oxford, and, after studying law in Edinburgh, became an advocate in 1816. His tastes led him towards literature, and his first work was a translation of Schlegel's *History of Literature*. He contributed frequently to *Blackwood's Magazine*, and is believed to have collaborated with James Hogg in the *Chaldee Manuscript*, one of the early successes of 'Maga.' Lockhart made the friendship of Sir Walter Scott, and in 1820 married his daughter Sophia. About this time he wrote the historical part of the *Edinburgh Annual Register*, and in 1819 published *Peter's Letters to his Kinsfolk*, a description of Edinburgh society. Into it was infused not a little of Lockhart's irrepressible satire, which gave rise to some bitterness among Edinburgh Whigs. In 1825 Lockhart accepted the editorship of the *Quarterly Review*, which he conducted with marked success until 1853. At this time he wrote a 'Life of Burns' for *Constable's Miscellany* (1828), and a 'Life of Napoleon' (1829) for *Murray's Family Library*, the publication of which he superintended. In 1838 appeared the last volume of his *Life of Scott*—his greatest work. Lockhart also published four novels; *Ancient Spanish Ballads* (trans. 1823); a *History of the late War, with Sketches of Nelson, Wellington, and Napoleon* (1832); and *The Ballantine Humbug Handled* (1839). See Lang's *Life and Letters of Lockhart* (1897); Croker's *Memoirs* (1884); Smiles's *Memoirs of John Murray* (1891); and Ormsby's *Memoirs of Hope-Scott* (1884).

Lockhart, WILLIAM EWART (1846-1900), Scottish painter, studied in Edinburgh, where he resided until he removed to London (1887). His chief works were concerned with Spanish and Majorcan subjects; among them, *The Orange Harvest*, *Majorca, The Cid and the Five Moorish Kings*, and *A Church Lottery in Spain* are of special merit. His vigour and bright colouring were eminently fitted for the subjects he adopted. By Queen Victoria's command he painted the jubilee celebration in Westminster Abbey (1887).

Lockhart, SIR WILLIAM STEPHEN ALEXANDER (1841-1900), British general; entered the Indian army (1858); served in the Bhutan campaigns (1864-6), and accompanied the Abyssinian expedition (1867-8). He rendered valuable service in the Afghan war (1878-80) and the Burmese war (1886-7). He commanded the Punjab frontier force (1890-5), and showed marked ability in his conduct of the Tirah campaign (1897). He became commander-in-chief in India (1898).

Lock Haven, city, Clinton co., Pennsylvania, U.S.A., on Susquehanna R., 69 m. n.w. of Harrisburg. Has important timber trade. Pop. (1900) 7,210.

Lockjaw. See TETANUS.

Lockport, city, New York, U.S.A., co. seat of Niagara co., 25 m. from Buffalo, and is on the Erie Canal. Famous for its fruits. Pop. (1900) 16,581.

Lockroy, EDOUARD ETIENNE ANTOINE (1838), French politician and journalist; studied art in Paris, and accompanied Rénan as secretary and draughtsman to the Holy Land (1860-4). On his return he became a journalist in Paris, and was elected to the National Assembly, resigning at the communal outbreak. He was re-elected later, and became minister of commerce (1886), of education (1888), and minister of marine (1895-6 and 1898-9). He is an authority on naval matters.

Locks and Keys. Primitive fastenings consisted of intricately knotted thongs, seals, or the branch or plain wooden bar placed across the inside of a door. Of the first, the Gordian knot is an example; of the second, we have numerous specimens in clay, used upon Egyptian corn jars, as well as many Scriptural and classical references. From the horizontal wooden bar, made at an early period to slide in staples on the back of the door and to fit a hole in the door-post, has arisen the modern lock. To move such a bar through a hole from the outside, or to release whatever held it, a cranked or curved piece of metal with straight handle would be suitable. Such hook-like or sickle-shaped keys have been found in many parts of Northern Europe, those in England being usually associated with remains attributed to the Celtic period. (Pitt-Rivers.) The Guildhall Museum, London, has some specimens.

It is obvious that the simplest method to prevent the bolt or bar from sliding would be to bore a vertical hole into it through the top of one of its staples, and to insert a dropping peg into the hole. In this case the function of the key would be first of all to remove the peg by lifting it up,

thus giving freedom to the bolt. The Egyptians fashioned their locks upon this idea, introducing a cluster of such dropping pegs or pins. They made the portion of the bolt into which the pins dropped hollow, so that their lower ends could be reached by the key from below; and the key they fashioned had pins upon it

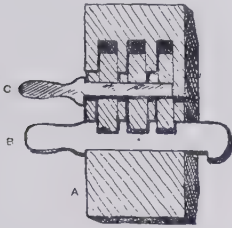


FIG. 1.

to correspond with those holding the bolt. Their lock or bolt was fastened upon the outside of the door. A lock like that of Egypt, but not quite identical with it, is found widely distributed in many out-of-the-way places in Europe (Fig. 1). The illustration is made from one on a barn door near Thun, Switzerland, and shows its back, after removal. In this, A is the staple or case, and B is the bolt sliding across it. The bolt is secured by flat dropping pins, which fall into notches cut in its edge. The pins are squared in section, and to lift them the key C is provided with projections. The key is inserted through the side of the staple, and not into the end of the bolt, as in that of Egypt.

The commonest form of the Roman lock is essentially based on that of Egypt, but the bolt is now a small one, often of bronze, and the dropping pins that hold it are round, square, or triangular in section, and are pressed downwards by a spring. The projections on the key are shaped so as to correspond with the ever-varying shapes and positions of the pins. The keys introduced do not pass into the end or side of the bolt, but into a casing, as in modern locks, and catch the bolts



FIG. 2.

on their lower surfaces. When the key has been introduced through the keyhole and has been given a quarter turn to push up the pins out of the way, a horizontal extension of the keyhole allows the user to slide it

sideways and so move the bolt into its unlocked position.

The Romans, however, had many other varieties of locks, prominent amongst them being those in which the bolt was kept locked by the projection of an expanding spring or springs, the end of which butted against a stop. In locks based on this principle, the function of the key was to pull back or compress the springs, and when these were flattened the key itself moved the bolt to and fro. This mechanism was largely adopted in their padlocks, and we now come across a very curious fact—*viz.* that the present-day padlock of China and Japan (Fig. 2) is made to act exactly in the same way as the Roman. As Roman togas probably had no pockets, keys which had to be carried on the person were often formed with finger rings on their stems (Fig. 3).

Early English and mediæval keys of bronze have their 'bows' formed in ecclesiastical shapes—lozenges, trefoils, quatrefoils, and the like. Their shanks are round, and the projecting 'bits' that work the bolt are stepped and cut as if to avoid fixed wards inside the lock case. The shanks were either hollow or terminated in a solid point, thus allowing them to work in the lock on a fixed centre. They were, in fact, the direct mechanical ancestors of the keys of the present day.

The lock bolts of the period have a notch, technically called a 'talon,' in their lower edge to receive the nose of the keybit, and thus be moved to and fro. There now also appears, presumably for the first time, a pivoted tumbler or lever in place of the early dropping pins; this 'dogs' the bolt, and has to be moved up out of the way by the key as it rotates, before engaging with the bolt.

But from an early date, and onwards to the close of the 18th century, the chief method adopted to attain security (with the exception of the letter padlock) was the use of fixed internal obstructions in the lock case, the bit of the key being formed so as to escape them as it was turned to reach the bolt. These obstructions are called 'wards,' and were made of small, bent strips of iron, brazed together inside the circular casing, the whole being called a 'box of wards.' The keyhole was generally covered up and masked by a secret spring escutcheon forming part of the design on the outside.

The French workers excelled both in key and lock fronts, many of the latter being so artistic and valuable that their owners re-

moved them when changing residence. Jousse, a French locksmith, writing in 1627, gives many interesting details of his trade. His book can be consulted in the British Museum. Many of the

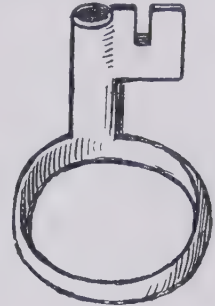


FIG. 3.

examples in his drawings are unattractive, but his best is reproduced in Fig. 4. This is somewhat like the famed Strozzi key, said to have been made by Benvenuto Cellini.

To obtain full information on the subject of mediæval and renaissance locks and keys, reference may be made to the able and comprehensive notes of Mr. Starkie Gardner in the catalogue of a Loan Exhibition of Steel Work held at the Burlington



FIG. 4.

Fine Arts Club (Batsford, London, 1900).

Before dealing with modern locks, it should be stated that about the time of Charles II. there was quite an export of ornamental keys from England

to France. The bows of these were flat and thin, the steel being pierced all over so as to leave graceful scrolls, ciphers, and monograms, and often the coronet of the noble owner for whom they were made. This period seems to have been the only one in which English workers for a short time vied with those of the Continent as regards ornamental work.

The first advance in the mechanics of modern lock-making was made in 1774 by Barron, who placed two pivoted catches or tumblers to guard the bolt, instead of one only, as in the 13th-century lock. He also made them in such a way that if either were lifted up beyond the height requisite to free the bolt, the bolt still remained locked.

This was followed in 1784 by the Bramah lock, a distinct novelty at the time as regards its kinematic elements. In this a thick disc of metal is housed in a casing or barrel, and, when free to turn, actuates the bolt of the lock by means of a pin on its under side. But it is normally kept from turning by several sliding steel strips or feathers, which lie in slots cut around its circumferential edge. These sliders, as they are called, are pressed upwards by springs, and have to be pushed downwards by the key. Notches to fit the sliders are cut in the end of the key-barrel. These notches are of varying depth, and consequently push some of the sliders in more than others—hence the different combinations. When they have all been pushed down their correct distances, little side openings in them match the edges of a fixed diaphragm, and they are free to pass round the inside casing together with the central disc that carries them, the turning of which is also done by the key.

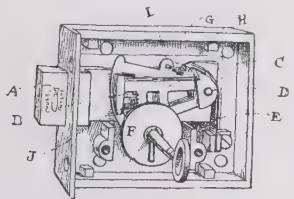


FIG. 5.

The Chubb detector lock was originally patented in 1818, and has been altered, added to, and improved many times since that date (Fig. 5). In its simplest form it consists of a bolt A, into which is firmly riveted the projecting stud or stump B. The movement of the bolt A is governed usually by six double-acting tumblers—called also levers—C working on the

stump D, and always pressed downwards by the springs E. The tumblers have internal openings or 'racks,' two of which are connected by a passage or 'gating' wide enough to allow the stump B to pass. The 'gatings' are in different positions, so as to accord with the varying heights of the steps on the key in relation to the tumbler against which each step works. After the key has been introduced into the lock and

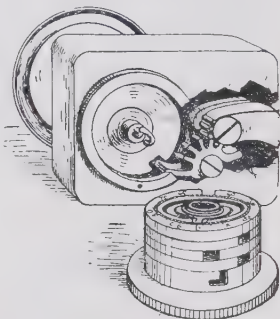


FIG. 6.

turned about ninety degrees, it commences to lift the tumblers; and by the time its bottom or bolt step is in contact with the 'talon' (see *ante*) of the bolt their 'gatings' all coincide, thus providing a clear passage for the stump B to pass along. The keyhole is protected by a barrel and curtain F, which entirely closes it up while the key is being turned. The detecting mechanism is explained by the spring G, the projecting portion on the bottom tumbler H, and the pin I, which is also mounted on the bottom tumbler, and so placed that all the other five can operate it if they are lifted too high. If a pick or wrong key is introduced into the lock which lifts any one of the tumblers beyond its proper height, this motion is communicated to the bottom one through the pin I, and its projection H gets caught on the spring G. In this condition the lock cannot be opened in its ordinary way, even by its proper key; and the owner, therefore, is notified by the lock itself that some unauthorized person has been tampering with it. To put it once more into working order, the owner has to turn his key the reverse way as if to lock it.

The Yale lock, very popular in the United States, was invented about 1860. It consists of a barrel which turns in a cylinder to move the bolt. It is a 'tumbler' lock, having five divided pin tumblers which are gradually raised by the key until they are all exactly to the line between the barrel and

the cylinder, both the small flat key and the keyway having a peculiar form of cross section, making these parts interlocking throughout their length.

The lock chiefly used on safes in the United States consists of concentric discs or wheels, each having a notch on its edge. On the outside of the safe a dial is mounted on the spindle which passes through the door to work the wheels. The circumference of the dial is divided into one hundred divisions, and the operator has to turn it successively to the right and left until the notches of the discs all coincide, when a 'dog' or catch falls into them, withdrawing the bolt of the lock as it falls (Fig. 6).

A most important development in recent years has been the application of watch or time movements, so as to regulate the period during which an obstructing bolt is to be kept in its locked position. In a suitable case mounted on the inside of the safe or strong-room door are three—sometimes four—distinct chronometer 'movements.' Each 'movement,' instead of having ordinary clock hands, possesses a simple dial divided into seventy-two hours or three days, and is arranged to make one revolution in that time. Each disc has a pin projecting from it, so placed as to move or slide a simple rod when the time has come for unlocking, the rod in its turn releasing the obstructing bolt; this then falls down by its own weight out of the way (Fig. 7). In setting this lock, it is only necessary to wind up each 'movement' for the predetermined number of hours that the safe door is to remain shut, and this precludes the use of any other locks with which the door may also be fitted until the proper time for opening has arrived. Any one of the 'movements' is capable of alone putting the lock 'off guard,' but three or four

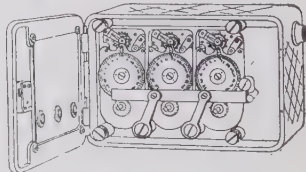


FIG. 7.

are provided in case of a possible breakdown on the part of one or two. Where it is wished to have no hole whatever of any kind through the safe door, the large main bolts that keep it shut are worked by energy stored in springs, and these are tripped up and allowed to come into action by the 'timer' at the predetermined hour.

Lockwood, SIR FRANK (1846-97), English lawyer, educated at Manchester and Caius College, Cambridge, and called to the bar (1872). In 1879 his defence of Charles Peace, the murderer, brought him before the public. He became Q.C. (1882), and re-ordered for Sheffield (1884). In 1885 he was returned as one of the Liberal members for York, and held the seat till his death. He was solicitor-general in 1894. An excellent draughtsman, he made amusing sketches in court and in the House of Commons, afterwards published as *The Frank Lockwood Sketch-Book* (1898). His *Lecture on the Law and Lawyers of Pickwick* (1894) reached a second edition.

Lockyer, SIR JOSEPH NORMAN (1836), English astronomer, born at Rugby; entered the War Office (1857), acted as secretary to the Royal Commission on Science (1870), was transferred to the Science and Art Department (1875), and became director of the Solar Physics Observatory, South Kensington (1879). He independently originated (1868) the spectroscopic method of daylight chromospheric observation, and led nine eclipse expeditions (1870-1905). Theories of celestial dissociation and sidereal evolution from meteor swarms were advocated in his *Chemistry of the Sun* (1887), *Meteoric Hypothesis* (1890), *The Sun's Place in Nature* (1897), and *Inorganic Evolution* (1900).

Locle, LE, tn. in the Swiss canton of Neuchâtel, and 5 m. s.w. of La Chaux de Fonds. The town is now one of the chief centres of the watchmaking industry, which dates from 1831. Pop. (1900) 12,520.

Locomotives. See STEAM-ENGINES.

Locomotor ataxia, or **TABES DORSALIS**, is a nervous disease characterized by incoordination of muscular movements, and by trophic and sensory disturbances with involvement of the special senses, of which the eyes are chiefly affected. The cause of the disease is obscure; it is most common in males between thirty and forty years of age, and occurs more frequently in cities than in the country. Syphilis is a factor of the greatest importance, but does not account for all cases. Three stages are recognized—the pre-ataxic, the ataxic, and the paralytic. The disease is frequently arrested, and may remain stationary for years.

Locri. (1.) Peoples of ancient Greece, the inhabitants of two districts each called Locris, of which the eastern lay south of Thessaly, along the coast of the Maliac Gulf, enclosed by Doris and Phocis on the west. It was a

fertile country. The western district, the country of the Locri Ozolæ, lay on the northern shore of the Corinthian gulf between Phocis and Ætolia; its chief town was Amphissa. (2.) **L. EPIZEPHYRII** was one of the most ancient Greek colonies in S. Italy. It was situated in the south-east of Bruttium (now Calabria) to the north of the promontory of Zephyrium, from which it derived its distinguishing designation, and was founded by Locrians from Greece in 683 B.C. It was renowned for the excellence of its code of laws, framed by Zaleucus in the 6th century B.C.

Löcse, Hungary. See LEUT-SCHAU.

Locus, in mathematics, a curve or surface traced out by a point or line which has a limited freedom of motion determined by given geometric conditions. For example, all points in a plane from which a given straight line subtends a right angle lie on a circle with the given line as diameter; in space the locus similarly defined is a sphere. Again, the vertices of all triangles on a given base and with a given perimeter have for their locus a spheroid, of which the ends of the base are the foci. See CURVE.

Locus Standi. The term is used generally of a person's right to be represented or heard in any litigation, and technically of the right of a person or corporation, if injuriously affected, to petition against a private bill. *Locus standi* is governed by the standing orders of the House of Commons. The following persons may petition:—Competitors; chambers of commerce and agriculture as to rates; miners' associations; municipal authorities; local authorities, as to lighting and water bills; county councils and private individuals who claim that they are injuriously affected by a tramway passing through their streets; and all persons whose land is taken compulsorily. Questions of *locus standi* are determined by the Court of References.

Locust, an orthopterous or straight-winged insect belonging to the family Acridiidae. In the article GRASSHOPPER some account of the general characteristics of the family will be found; it remains only to mention some of the more destructive forms of locust. The European form is *Pachytylus cinerascens*, found over a great part of the eastern hemisphere; but another species, *P. migratorius*, occurs in S.E. Europe. Other species of *Pachytylus* occur in Africa, and are often excessively destructive. In some of the African forms the migrations are

performed not only by the winged adults, but also by the young before the development of the wings, when they are locally known as 'voetgangers.' The locust swarms show a great indifference to the nature of their food, and will eat anything green which comes in their way, and even, when pressed by hunger, attack the young of their own species. The number of individuals contained in a large swarm is almost incalculable; but it has been shown that very large swarms only visit a particular locality at intervals of several years. This has been ascribed to the action of three causes—(1) the attacks of parasitic insects; (2) the fact that the eggs may remain more than one year in the ground, and yet hatch if a favourable season occurs; and (3) the fact that the migratory instinct does not appear unless a large number of superfluous individuals are produced.



Locust (*Pachytylus migratorius*).

The life history is similar in all cases. The female deposits a number of eggs in hard ground in a hole made for the purpose, and surrounds the eggs with a fluid which hardens into a capsule. After a period of varying length the young hatch out, being like the parents, except that they have no wings, have shorter antennae, and are of smaller size. After successive moults they become adult and capable of reproduction.

Destruction of Locusts.—Where locusts are abundant, they may render agriculture almost impossible, and in consequence many methods of destruction have been advocated. In Cyprus, where they were formerly a plague, what is known as the Mattei system has been adopted with remarkable success. In essence this consists in destroying the pests in the wingless stage by taking advantage of the fact that they are unable to climb up or over a smooth surface. The method adopted is to construct a canvas screen about four feet high along the line of march, and at intervals along the screen to

dig pits. The locusts, on finding themselves unable to pass the screen, turn along it, and ultimately fall into one of the pits, where they are soon buried under the bodies of their fellows, until the pits are nearly full, when they are filled in with earth. It is calculated that in 1883 nearly 200,000 millions of locusts were killed in this way. So successful, indeed, was the method that of recent years locusts have become so few in the island that it is no longer necessary, and preventive measures are limited to the offering of rewards for live locusts, caught in large nets. In 1901 the cost of the locust campaign, which was over £12,000 in 1883, fell to £4,500, and in 1902 to £1,900. In S. Africa, on the other hand, where the Mattei method has also been tried, it appears to have been much less successful, and parts of the country are periodically devastated by locusts. There, in addition to the Mattei method, the eggs are collected and destroyed, and attempts have also been made to inoculate the insects with disease, in the hope that this may be spread by the habit of cannibalism which prevails among locusts.

Locusta, or **LUCUSTA**, a notorious female poisoner in ancient Rome; employed by Agrippina to kill her husband, the Emperor Claudius, for which service she was rewarded with large estates by Nero. She was executed in the reign of his successor, Galba.

Locust Tree, a name given to certain trees and shrubs belonging to the genus *Robinia*, order Leguminosæ, natives of N. America. They are hardy in this country, of handsome growth, not particular as to soil, and therefore are desirable trees for cultivation. The common locust tree, or false acacia (*R. pseudacacia*), bears in spring pendulous racemes of white, fragrant flowers, followed by smooth legumes. Of this species there are many useful varieties. *Ceratonia siliqua* (carob tree) is also called the 'locust tree,' as it has been supposed to have formed the food of John the Baptist in the wilderness. Hence it is also termed 'St. John's bread.' Its pods are the so-called 'locust beans.'

Lodes, or **MINERAL VEINS**, are metalliferous deposits occupying fissures in the rocks of the earth's crust. The term is somewhat loosely used even by professional miners, who do not distinguish between the beds, or contemporaneous deposits, and the veins, which are subsequent, and have been filled up at a later period than the beds they intersect. Veins, as a rule, do not coincide with bedding planes, except

when these are at a high angle with the horizontal; the bedding is mostly less steeply inclined than the veins. The slope of a vein is known as the dip or hade; the strike, or course, is the horizontal direction; the outcrop, or back, is the surface indication of the vein. It may stand up as a reef, and the gossan, or weathered back, is carefully searched by prospectors for indications of metallic minerals and their decomposition products. On each side of the vein lies the 'country' or 'country rock,' that part which overlies the vein is the hanging wall; the underlying side is the foot wall; and the faces of the country rock where it adjoins the vein are known as the cheeks.

The vein is occupied by 'vein stuff,' which is not all metalliferous, but consists of gangue (or valueless minerals) and ore. Two or more ores, such as copper and tin or lead and silver, may occur in the same vein. One or both walls of the lode may be covered with a layer of clay, known as the selvage or flucan. The terms employed by miners are mostly derived from Cornwall, Saxony, and other districts where deep mining has been pursued for hundreds of years; but local usages vary in different parts of the world. The veins may be a hundred feet or more in breadth, or may only be a fraction of an inch. The broadest veins are usually most persistent both in length and in depth, but all veins are liable to thin away or die out, though some have been traced for several miles. The Comstock lode has been followed to a depth of 3,000 ft., and many veins have been proved to almost equal depths; but it is probable that all fissures tend to close up in the deeper parts of the crust. The upper part of the vein, however, is usually the richest, owing to 'surface enrichment.' This is a consequence of the disintegration and removal of the outcrop as the ground is lowered by denudation. The heavier metallic particles are not so readily washed away as the gangue, but remain behind, and settle down into the loosened material of the vein. It is also thoroughly weathered and oxidized by the action of the atmosphere and percolating waters; hence the upper part of a vein is often excessively rich, and contains the minerals in a condition which renders extraction especially easy. The minerals also change in character, and though native metals, oxides, and carbonates are common above (in the zone of oxidation), sulphides, tellurides, and arsenides are most frequent below.

Metalliferous veins often thin out and thicken very irregularly, and the materials which form the vein are rarely uniform throughout. Parts rich in ore (known as leaders, shoots, bonanzas, etc.) usually alternate with poorer stone. Very rarely do metalliferous minerals occupy the whole fissure; usually they form only a small percentage of the mass (so small in certain gold ores that they are not visible to the naked eye), and may be uniformly disseminated or collected into pockets, strings, and irregular bunches.

When beds of rock are much tilted, fissures may open parallel to the bedding planes, and may be infilled with ore deposits. Such veins are often very hard to distinguish from true beds, though quite different in their origin. In the main reef series in the Transvaal, beds of conglomerate, which have been so disturbed as to have a steep dip, have been infiltrated with gold, deposited, mostly at any rate, from solution in circulating waters. Although truly a bedded ore, this auriferous conglomerate, the 'basket' rock, owes its richness to processes similar to those which determine the formation of veins. In Australia many important mines are working saddle reefs, a curious type of vein which occurs as curved saddle-shaped plates between undulating beds of country rock. Instances of this are the New Chum mine and the famous Mt. Morgan mine.

The origin of lodes has been the subject of much controversy. One hypothesis is that of lateral section. Its supporters point out that most rocks and rock-forming minerals contain small quantities of the useful metals, which may be dissolved out by water percolating through these rocks, and subsequently deposited in fissures. The other theory is that of 'ascension.' It is based on the fact that hot ascending mineral waters are known at the present day to contain metals in solution, and to deposit them on the walls of the passages through which they rise to the surface. The opinion that metalliferous veins were mostly formed in the earlier epochs of the earth's history is now no longer generally held, as it is known that some of them occur in Tertiary rocks, while others are being laid down at the present day. See Phillips's *Treatise on Ore Deposits* (1884, 2nd ed. by Professor Louis, 1896), and Kemp's *Ore Deposits of the United States* (1900).

Lodestone, a variety of magnetite, Fe_3O_4 , which acts as a magnet, exhibiting well-defined N. and S. poles. See IRON and MAGNETISM.

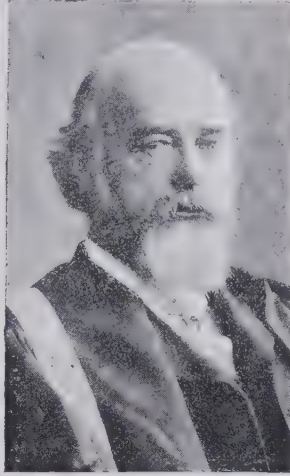
Lodève (anc. *Luteva*; Rom. *Forum Neronis*), tn., dep. Hérault, France, at confluence of Eugue R., 36 m. N.W. of Montpellier; manufactures army clothing, wine, and woollens. Its mediæval walls and 13th-century cathedral remain. Cardinal Fleury was a native. Pop. (1900) 8,200.

Lodge, EDMUND (1756-1839), English genealogist and biographer, born in London, entered the army (1771), but resigned his commission in 1773, and held the offices of Lancaster (1793-1822), Norroy (1822-38), and Clarenceux (1838-39) herald successively. His chief work is a series of historical memoirs attached to *Portraits of Illustrious Personages of Great Britain* (1821-34). He also wrote historical and genealogical works, including *The Genealogy of the existing British Peerage* (1832), and his name still appears annually in connection with *Lodge's Peerage and Baronetage*.

Lodge, HENRY CABOT (1850), American historian, born at Boston. He edited the *North American Review* (1873-76) and the *International Review* (1879-81); was university lecturer on American history, and has been overseer of Harvard since 1884, and a United States senator since 1893. His works include *Essays on Anglo-Saxon Land Law* (1885), *Short History of the English Colonies in America* (1881), *Studies in History* (1884), *Life and Letters of George Cabot* (1877), and *The Story of the American Revolution* (1898).

Lodge, SIR OLIVER JOSEPH (1851), English physicist, was born at Penkull, Staffordshire; educated at Newport grammar school and University College, London, and graduated at London University as doctor of science (1877). In 1881 he was appointed professor of physics at the newly founded University College of Liverpool, and in 1900 became principal of the new Birmingham University. He was awarded the Rumford medal by the Royal Society in 1898, and was knighted in 1902. His numerous papers deal chiefly with electrical science, such as the theories of contact electricity and of electrolysis, the action of lightning conductors, the oscillatory discharge in Leyden jars, and the production of electro-magnetic waves in air (see HERTZ), the development of wireless telegraphy and its indispensable piece of apparatus called by him the 'coherer.' He also carried out with great skill a difficult experiment to determine whether rapidly moving heavy matter exerted a drag on the ether. The result was negative. He is the author of a book on elementary mechanics containing some novelties of treatment. His

Modern Views of Electricity (1889; new ed. 1892) and *Pioneers of Science* (1893; new ed. 1904) rank among the best of popular scientific books. He has also written on *Signalling across Space without Wires* (3rd ed. 1900), on *Lightning Conductors and Lightning Guards* (1892), *Life and Matter* (1905), etc.



Sir Oliver Joseph Lodge.

(Photo by H. J. Whitlock & Sons, Ltd.)

His purely scientific work has been supplemented by excursions into the mystic fields of spiritualism and psychical research generally. His public utterances on these as well as on scientific questions are always fresh and interesting. One of the latest problems to which he has directed attention is the mitigation of city fogs by forcing condensation by means of strong electric fields.

Lodge, RICHARD (1855), brother of Sir Oliver, born at Penkull, Staffordshire; educated at Christ's Hospital and Balliol College, Oxford, where he took a first-class in modern history at Oxford (1877); after a brilliant career was a fellow and lecturer of Brasenose, till he was appointed as the first professor of history at Glasgow University (1894), being later elected to a similar chair in Edinburgh (1899). He has written *A History of Modern Europe* (1885), *Richelieu* (1896), *The Close of the Middle Ages, 1273-1494, Period III.* (1901).

Lodge, THOMAS (?1558-1625), English poet and pamphleteer, the son of a lord mayor, was born probably at West Ham, Essex. He was educated at the Merchant Taylors' School, Trinity College, Oxford, and Lincoln's Inn, where he was called to the bar (1578); but he drifted into literary work. In 1580

he wrote a *Defence of Plays* against the Puritans. About 1587 he wrote *The Wounds of Civill War*, for the Admiral's men, and collaborated with Greene in *A Looking-Glass for London and England*, for those of Lord Strange (1594). The rest of his work consists mainly of miscellaneous pamphlets, or of stories in a euphuistic or a pastoral vein. He also wrote satires and some exquisite lyrical verse. About 1606 he left London as a recusant, and though he returned from time to time, most of his later life was spent abroad. Among his numerous works are:—*Poems: Scillaes Metamorphosis* (1589); *Phyllis* (1593); *A Fig for Momus* (1595). Prose: *Alarum against Usurers* (1584); *Forbonius and Prisceria* (1584); *Rosalynde* (1590), the source of Shakespeare's *As You Like It*; *Catharos* (1591); *Euphuus's Shadow* (1592); *William Longbeard* (1593); and *A Margarite of America* (1596). The best edition of Lodge's Works is that published by the Hunterian Club (1878-82).

Lodgings and Lodgers. An agreement to let furnished lodgings is an agreement relating to land under the Statute of Frauds, and in the absence of part performance cannot be enforced, unless in writing signed by the defendant. In the letting of furnished apartments there is an implied warranty that the rooms are fit for occupation. Any person who lets lodgings without disinfecting them after infectious disease, or gives a false answer to any question as to the existence of any infectious disease, is liable to a fine of £20, or, in the case of a false answer, to six months' imprisonment. A lodging-house keeper is not liable if his lodger's property is stolen by a servant. A lodger's goods are no longer liable to be taken under a distress put in by the superior landlord, provided such lodger complies with the formalities of the Lodgers' Goods Protection Act, 1871, which does not apply to Scotland, and has paid his rent to his landlord, or, if in default in this respect, pays it to the superior landlord. A lodger's wearing apparel and other effects may be retained as security for his board and lodgings, but cannot be sold without judicial authority. See LANDLORD AND TENANT, and FRANCISE.

Lodi. (1.) Town, prov. Milan, Lombardy, Italy, on the r. bk. of the Adda R., 18 m. S.E. of Milan; manufactures majolica, and Parmesan cheese and other dairy produce. The cathedral dates from 1158. Pop. (comm.) 27,811. (2.) L. VECCHIO (anc. *Lavis Pompeia*), vil., prov. Milan, Italy, 5 m. W. of Lodi.

Lodoicea, a genus of fan-leaved palms, containing only one species, *L. Sechellarum*, a native of the Seychelles I., where it grows to a height of a hundred feet. The fruits are very large, sometimes weighing half a hundredweight. It may be cultivated as a stove plant in this country.

Lodomeria (Vladimir), the Latin name for the Slav principality in W. Poland. It rose into power in the 12th century. From 1340 to 1772 Lodomeria owned allegiance to Poland, but in the latter year it became part of Galicia.

Lodz, tn., Piotrkow gov., Poland, W. Russia, 27 m. N.N.W. of Piotrkow city, on the Lodka (or Ludka). It has grown more rapidly than any city in Europe, and is now the fifth largest town in the Russian empire. Its numerous industrial establishments employ over 30,000 workmen, and

or fine desert sand retained where deposited in the dry season round grass and other steppe plants. It is usually tubular, the plant stems having decomposed, and often forms vertical cliffs, which in China are 500 ft. high and burrowed with caves. It is found on the margin of deserts from which winds blow in the dry season—e.g. China—and here the eolian origin seems undoubted. It is also found beyond the terminal moraines of the great ice age in Europe and in N. and S. America. Round about salt lakes a variety is found without the vertical tubes. The deposit is probably very slow. Loczy found tombs two thousand years old buried under only seven or eight feet of loess. Yet the thickness may be great, rising from 1,500 to 2,000 ft. in China, and from 2,000 to 3,000 ft. in the Adobe regions of N. America. Where water can

was called to the bar in 1775; but the greater part of his life was spent on his estates near Bury St. Edmunds. A zealous Whig, and an opponent of the American war and of the slave trade, he also took a leading part in local agitation for parliamentary reform. Loft was the author of various essays on constitutional and political subjects, and of poems. He was satirized by Byron in *English Bards and Scotch Reviewers*. See *Gent. Mag.* n. 184, and Glyde's *New Suffolk Garland* (1866).

Lofoten, LOFODEN, or LOFFODEN ISLANDS ('Lyn Foot'), large group of islands, Norway, between 67° 40' and 69° 21' N.; 12° and 17° E., separated from the mainland by the Westfjord. The group falls into the sections consisting of (1) the Lofotens proper in the s., comprising Ostvaagö, Vestvaagö, Flakstadö, and Moskenaesö; (2) Vaerö and Rost and the Vesterdaalen, to which belong Hindö, Langö, and Andö. The two groups are separated from each other by the Hadsselfjord. Between the islets Moskenaesö and Mosken lies the once dreaded whirlpool Maelström. There is good pasture for cattle, and little snow falls in winter. Fishing is the chief means of subsistence. Area, over 2,000 sq. m. Pop. 37,000, doubled in the fishing season.

Loftie, WILLIAM JOHN (1839), journalist and author, born and educated in Ireland. His writings, chiefly antiquarian and topographical, include *Memorials of the Savoy* (1879), *A Ride in Egypt* (1879), *Guide to the Tower* (1886), *The Cathedral Churches of England and Wales* (1892), *The Inns of Court and Chancery* (1894), *London Afternoons* (1901), and *The Coronation Book of Edward VII.* (1903).

Lofty, MOUNT, highest point (2,334 ft.) of Mt. Lofty Range, S. Australia. The range runs from Cape Jervis towards the N., and forms the watershed between the rivers flowing E. to the Murray and the lakes and those flowing W. to Gulf St. Vincent.

Log. An apparatus used to measure a ship's speed. In its simplest form, as invented about 1620, it consists of the log-ship, the log-line, the log-reef, and the log-glass. The log-ship is a flat wooden board, triangular in shape, and weighted so as to float perpendicularly, with holes at two corners, to one of which the log-line is made fast by passing through and knotting, and in the other of which is a bone peg attached by means of a span to the log-line. For ascertaining the speed of a ship, the log-ship at the end of the line is thrown overboard astern, and the line is



Lofoden Islands.

produce £6,000,000 worth of annual output. The chief industry is cotton; after this come silk, wool, linen, cloth, flour, beer, spirits, iron. There are also extensive dye works, flour mills, and agricultural implement manufactures. Lodz covers an area of 10 sq. m. There are good technical and other schools. The population is mainly composed of Poles, Germans, and Jews, each amounting to nearly a third of the whole. The town was the scene of several strikes and much rioting during the Russian social disturbances of 1905. Pop. (1897) 315,209.

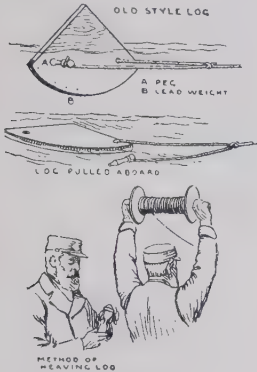
Loess, a fine porous siliceous and calcareous earth, usually yellow, uniform in composition and structure, and unstratified. The lime may form concretions (*Lössmännchen*). It is probably a wind-borne accumulation of dried mud

be supplied it gives an extremely fertile soil. The black earth (*chernozem*) of S. Russia and the black cotton soil (*regur*) of the Deccan have been explained as loess impregnated with humus, or the decomposition products of the underlying rocks.

Loewe, JOHANN CARL GOTTFRIED (1796-1869), German musical composer, born in Löbejün, near Halle, studied at Halle, and settled in Stettin (1821). A prolific composer, his works consist of operas, oratorios, symphonies, concertos, duets, and other pieces for the piano, and ballads. As a writer of the *art ballad* Loewe stands in the front rank. Among the best known of his ballads are his first two, *Edward* and *The Erl-King* (1818). See Bach's *The Art Ballad*, Loewe and Schubert (1890).

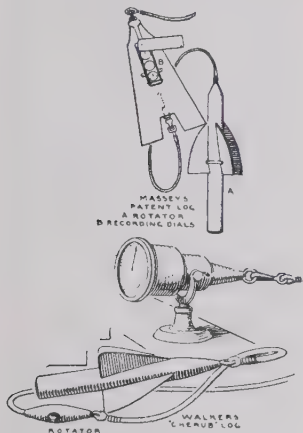
Loft, CAPELL (1751-1824), English author, born in London. He

paid out from the log-reel. The line is marked at certain intervals, and a sand-glass is turned over so as to begin running exactly when the line does. The log-line is marked off in lengths of 47 ft. 3 in. when a 28-seconds sand-glass is used, which is usual.



Log, old Pattern.

The lengths between the marks are determined from the fact that 47 ft. 3 in. bear the same proportion to a nautical mile as 28 seconds do to 1 hour. The first 10 fathoms or so of the line are 'stray line,' the allowance made for carrying the log, when it is heaved, away from the influence of the ship's wake.



Log, new Patterns.

A log was patented by Edward Massey of Hanley, Staffordshire, in 1834, for registering the speed of ships by a mechanism which was towed from the quarter, with line enough to clear the eddy in the wake of the ship, showing the distance actually gone through the water, by means of the revolutions of a fly-wheel, and register-

ing upon a dial plate the knots and tenths. Massey's original log was quickly improved by him and by others, especially by Walker. The 'Cherub' log, largely used in the navy, is of this type. See KNOT.

LOG-BOOK, the official journal of all important occurrences in and in connection with a ship. A log-book is usually kept upon printed forms, which are bound up together, containing ruled columns in which are entered the date, the nature and force of the wind, the state of the weather, the course, the currents encountered, the progress made, the performances of the engines, the state of the thermometer and barometer, the observed latitude and longitude, bearings and distances, and other particulars, together with remarks as to work done on board, places visited, punishments inflicted, drills carried out, health of the ship, and signals made and exchanged. The official ship's log is kept by the navigating officer in charge, and is initialed by the officer on watch. In addition to the ship's log-book, an engine-room register has to be kept by the engineer officer, and a gunnery log by the gunnery officer.

Logan, city, Utah, U.S.A., the co. seat of Cache co., on Logan R., in a rich mining and agricultural region. Industries: saw-mills and beet-sugar factories. Pop. (1900) 5,451.

Logan, MOUNT, peak (19,514 ft.) in the s.w. corner of the Yukon territory, close to the Alaskan boundary and N. of Mt. St. Elias. It is the second highest peak in N. America.

Logan, JOHN (1748-88), Scottish divine and poet, born in Fala parish, Midlothian; studied at Edinburgh University, and became collegiate minister of S. Leith (1773). Constrained by dissipation to resign his pastoral charge (1786), he retired on a small annuity, and, settling in London, contributed to the *English Review*, and did miscellaneous literary work. In 1770 Logan edited a volume of poems by his deceased fellow-student, Michael Bruce, inserting extraneous matter and taking other liberties, which were keenly resented by Bruce's friends. In 1781 a volume of his own poems was issued, containing various pieces claimed for Bruce, and especially a modified recast of the exquisite *Ode to the Cuckoo* included in the book of 1770. He published a *View of Ancient History* (1788-93), a *Review of the Principal Charges against Warren Hastings* (1788), and two volumes of his *Sermons* (1790-1). The *Visit to the Country in Autumn* and the fine ballad *Bruce of Yarrow* have undeniable

claims to recognition for their poetical merit. See Memoir prefixed to his *Sermons* (1810), Anderson's *British Poets* (1795), and MacLagan's *Scottish Paraphrases* (1889). The Bruce-Logan controversy has produced a large amount of literature on the subject of the authorship of *Ode to the Cuckoo*. See *Brit. and For. Evangelical Review*, 1877 and 1879.

Logan, JOHN ALEXANDER (1826-86), American politician and soldier, born in Jackson co., Illinois; served in the Mexican war, and after its close studied at Louisville, and was admitted to the bar. A member of Congress (1858-61), he joined the army of the North, and commanded with especial distinction till the end of the war. Re-entering Congress (1866), he became a senator (1871), being re-elected (1879 and 1885). In 1884 he was nominated as Republican candidate for the vice-presidency, but was defeated. Logan was author of *The Great Conspiracy* (1886) and *The Volunteer Soldier of America* (1888). See *Life* by Dawson (1887).

Logan, SIR WILLIAM EDMOND (1798-1875), Canadian geologist, born at Montreal; educated at Edinburgh High School, and, after being engaged in a mercantile house in London and copper-smelting works at Swansea (where he prepared maps of the Welsh coal basins), was placed at the head of the projected geological survey of Canada (1842), a post which he held till 1871. His so-called fossil, *Eozoön canadense*, discovered during this period, gave rise to considerable controversy as to its organic or inorganic origin. He published his *Geology of Canada* (1863). See *Life* by Harrington (1883).

Logania, a genus of Australasian and New Zealand shrubs, order Loganiaceæ, characterized by opposite, entire leaves, and by white or pale bell-shaped flowers, usually borne in cymes. In this country they are cultivated in sandy peat under glass.

Logansport, city, Indiana, U.S.A., the co. seat of Cass co., on the Wabash R., 115 m. S.E. of Chicago. It has good water power, and manufactures automobiles, carriages, water-wheels, and foundry products. Pop. (1900) 16,204.

Logarithms are numbers related to the natural numbers in such a way as to enable us to substitute addition for multiplication and subtraction for division. Their invention (by Napier of Merchiston, 1614) constituted one of the most fruitful advances ever made in practical mathematics. The principle of the method is contained in the algebraic law of indices, which asserts that $a^x \times a^y$

$= a^{x+y}$. If we put $a^x = m$ and $a^y = n$, the quantities x and y are the logarithms of the numbers m and n respectively to base a . If we represent m by its logarithm x , and n by its logarithm y , then the product mn will be represented by the sum $x + y$, and the ratio m/n by the difference $x - y$. Any number may be taken as base, but practically by far the most convenient base is 10. To this base the logarithm of 10 is 1; of 100, 2; of 1,000, 3; and so on, as indicated in the following table:—

Number.	Logarithm.
1	0
10	1
100	2
1,000	3
10,000	4
100,000	5
1,000,000	6
10,000,000	7
100,000,000	8

Evidently all numbers between 1 and 10 will have logarithms between 0 and 1, numbers between 10 and 100 will have logarithms between 1 and 2, and so on for all sets of numbers intermediate to successive powers of 10. For example, the logarithm of 2 is (to five figures) 0.30103. Since 20 is 10 times 2, the log. of 20 will be the sum of the logs. of 2 and 10—i.e. 1.30103. Similarly, log. 200 = 2.30103, log. 2000 = 3.30103, and so on. It is this property of the logarithms to base 10 which gives the system such a great advantage over systems to other bases. The fractional part of the logarithm is the same for the same succession of figures, quite independent of the position of the decimal point. The decimal point determines between which two powers of 10 the number lies, and the number which precedes the fractional part of the logarithm is known at once by mere inspection. For practical use it is convenient to tabulate the logarithms of all successive numbers to, say, five significant figures. By simple processes of interpolation it is easy to calculate from these the logarithms of numbers given to six or seven significant figures. For most practical purposes, seven-place logarithms are too accurate; six-place logarithms, or even five-place logarithms, are amply sufficient for nearly all purposes; and for many practical uses four-figure tables will suffice.

To facilitate trigonometrical calculations, it is usual to tabulate the logarithms of the circular functions of angles.

Logarithms to base 10 are usually called common logarithms, or Briggsian logarithms, after Briggs, who continued Napier's work by constructing the first

table of logarithms to base 10. But once logarithms have been calculated to any one base, they can be obtained to any other base by multiplying by the appropriate factor throughout. For if $n = a^y = 10^z$, we find at once $x \log. 10 = y \log. a$; and hence y is found from x by dividing by the logarithm of a to base 10. Now it may be shown

$$\text{that } a = N \left(1 + y + \frac{1}{2}y^2 + \frac{1}{2 \cdot 3}y^3 + \frac{1}{2 \cdot 3 \cdot 4}y^4 + \text{etc.} \right); \text{ and if we choose}$$

a such that $N = 1$, we find for its value the converging series—

$$e = 1 + 1 + \frac{1}{2} + \frac{1}{2 \cdot 3} + \frac{1}{2 \cdot 3 \cdot 4} + \frac{1}{2 \cdot 3 \cdot 4 \cdot 5} + \dots = 2.7182818 \dots$$

It is this base which gives what are called the natural, hyperbolic, or Napierian logarithms.

In all systems of logarithms the logarithm of unity is zero; hence the logarithms of proper fractions must be less than zero—i.e. they must be negative quantities. For example, the common logarithm of 0.2 is $\log. 2 - \log. 10 = 0.30103 - 1 = -0.69897$. It is usual, however, to keep the expression in the form first given—viz. -1.30103 , in which it is understood that the fractional part is positive. This is almost universally written in the more concise form $\bar{1}.30103$, in which the negative sign is represented by a short stroke over the characteristic or number before the decimal point.

The *logarithmic curve* is a curve whose one co-ordinate is the logarithm of the other co-ordinate. Its equation may be written in the form $y = \log. (x/a)$. The *logarithmic spiral* is represented by a similar equation between θ and r —viz. $\theta/a = \log. (r/a)$. The logarithmic spiral is also known as the equiangular spiral, because of the property that all *radii vectores* drawn from the pole cut the curve at the same angle for any one given curve.

Logau, FRIEDRICH, FREIHERR VON (1604–55). German poet, studied law at Frankfurt-on-the-Oder, and entered the service of the Duke of Liegnitz. The prevailing note of bitterness pervading his epigrammatic and satirical verse was doubtless deepened by public and private vicissitude. A selection made by Ramler and Lessing from Logau's *Sinngedichte* appeared in 1759; while a later selection from his poems, with biographical notice (1870), was followed by a complete edition, edited by Eitner (1872).

Loggia, the Italian name for galleries and verandas roofed over, but open on at least one side to the air. In Italy the name is also given to the numerous arcades and porches of

public buildings—e.g. those of the Vatican, decorated by Raphael and his pupils.

Logia, a Greek word (pl.) meaning 'oracles,' and often applied by Biblical scholars to a supposed collection of the *agrapha*, or 'sayings,' of Jesus. Papias, who lived in the first half of the 2nd century A.D., asserts that Matthew wrote a book of *logia* in Hebrew (i.e. Aramaic); but it is generally agreed that this cannot have been the canonical Matthew, which is an original, not a translated, work. The statement of Papias, however, has been of the highest service in pointing to a possible solution of the synoptic problem (see GOSPELS), as it indicates the existence of a collection of our Lord's utterances, which forms one of the sources of the 'two-document theory,' the other being the narrative of Mark, and which, existing in various forms, has been incorporated in our Matthew and Luke. That such books of *logia* were actually compiled is demonstrated by the discovery, in the Oxyrhynchite nome, of a papyrus leaf containing eight sayings (two mutilated), each beginning with the words 'Jesus said,' published by Grenfell and Hunt (1897).

Logic as the systematic study of reasoning or thought was created by Aristotle. His logical system is embodied in a number of writings collectively known as the *Organon* (see ARISTOTLE), and of these the three most important—viz. the *Prior* and *Posterior Analytics* and the *Topics*—belong closely together. They contain his theories of the syllogism, of scientific proof, of definition, of induction, and of probable reasoning, and together constitute a single and connected, though complex, investigation of scientific method and procedure. For Aristotle, logic was, in fact, the general theory of scientific method. His theory of syllogism is the central portion of his whole investigation, and constitutes in his view an analysis of the structure of all demonstration and proof. In every syllogism we have the two terms which are connected in the conclusion, and a middle term through which the connection is established. And the connection of the two extremes in the conclusion is affirmed in virtue of their clearly perceived relationship through or within the middle term, which relationship is explicitly set forth in the premises of the syllogism. Thus, when we want in geometry to prove that the sum of the three angles of a triangle is equal to two right angles, we do so by showing that the sum of the three angles of a triangle is equal to the sum

of any one angle and the adjacent exterior angle, and this latter sum we already know to be equal to two right angles. Here, then, we use the more general or elementary principle regarding the sum of the angles made by the junction of two lines (two sides of the triangle) to prove the required property of the triangle. And it is clear that the whole chain of demonstrations in which geometry consists may thus be resolved into a series of reasonings of whose essential structure the syllogism is an analysis. In Aristotle's view the essential nature of scientific proof consists in the deductive process by which we pass from universal principles to their necessary consequences. And such proof within any one science therefore depends in the last resort upon those fundamental or ultimate principles, which are assumed as the basis of all our demonstrations in that science, and which cannot themselves be demonstrated in deductive fashion. Such principles are arrived at inductively—i.e. they are suggested by an examination of instances. But this sort of suggestion is not strictly proof, and induction is thus subsidiary or preparatory to the deductive process of science proper.

The history of the Aristotelian logic has been largely a history of degeneration, and for this degeneration the mediæval scholastic logicians were chiefly responsible. To Aristotle the syllogism was the instrument or method of science; to the scholastic theologians it was a method of expounding the dogmas of the church, and of expanding these into all their remoter consequences and details.

In view of this degradation of the syllogistic logic to a mere formal method of disputation, it is not surprising that thinkers of the modern period, like Bacon and Locke, imbued with the new scientific spirit, should have conceived a strong distaste for such a logic, at any rate as a method of science. This antagonism of the empirical school was not lessened when, later in the modern period, a purely formal conception of logic was expressly put forward and defended on the basis of a rigid distinction between the form and the matter of thought by logicians under the influence of Kant. Such a type of logic was represented in this country by Hamilton and Mansel. J. S. Mill, on the other hand, the contemporary representative of the empirical school, upheld their traditional view by attacking the syllogism as a *petitio principii*, and developing his own analysis of the inductive methods of scientific proof as a real logic of

investigation—a logic of truth as opposed to a mere logic of consistency. And accordingly, in several of our most popular and widely used text-books, written under the influence of Mill's great work, we find a sharp division made between deductive and inductive logic—the former dealing with the merely formal manipulation of propositions and reasonings, the latter with the real processes of scientific inference.

But from this condition of things modern logic has tended, and more especially within recent years, to diverge in two opposite directions. The purely formal logic of the formal logicians has given rise to a still more extreme symbolic logic, which attempts to express the processes of thinking by mathematical methods and formulæ. (See Venn's *Symbolic Logic*, 2nd ed. 1894.) And, on the other hand, philosophical logicians have, in a manner, returned to the genuine Aristotelian standpoint, and, treating logic as the theory of knowledge or science, have re-vindicating for deduction its true place in logical theory. The abstract separation of the form from the matter of thought has been rejected, and a more real interpretation of deductive method has been made possible; while induction is seen, when rightly interpreted, to be simply the inverse process of deduction. (See INDUCTION.) This more philosophical type of logic was revived in this country by Bradley's *Principles of Logic* (1883), a keen criticism of current logical theories, which was followed up by the masterly constructive work of Bosanquet (*Logic*, 2 vols. 1888). The translated logics of Lotze and Sigwart have contributed powerfully to the same general tendency to treat logic as a theory of knowledge and scientific method. From such a standpoint logic and epistemology become identical, and no hard and fast line can be drawn between logic and metaphysics. (See PHILOSOPHY.) The revival of philosophical logic in England was due to the influence of German post-Kantian idealism, and partakes of the metaphysical character of the latter; but quite apart from this influence, other important contributions have been made, which are in line with Mill in bringing logic into close relation with science. Of these, Venn's *Empirical Logic* (1889) may be said to be a very valuable revision of Mill, while Jevons's *Principles of Science* (2nd ed. 1877) combines the scientific standpoint with symbolic methods. The best recent work on the lines of the older formal logic is Keynes's *Formal Logic* (3rd ed. 1894).

Logogram (Gr. *logos*, 'word'; *gramma*, 'letter'), a form of puzzle in which, a word having been selected (as, for example, 'mate'), as many anagrams as possible are formed from it ('team,' 'meat,' 'tame'). These anagrams themselves are not mentioned; but in the verses which form the puzzle either their synonyms (e.g. 'yoke,' 'food,' 'domesticated') or a description of them is contained. The reader is required from this to guess the original word. See ANAGRAM; also Wheatley's *Anagrams* (1862).

Logone, now part of the north of Kamerun, Central Africa; consists of a well-wooded plain. Its people are allied to the Makaris and Musgu. Logone is the capital. Pop. estimated at 250,000.

Logos (Gr. *logos*, 'word,' 'discourse,' 'reason'), a term applied in the prologue of John's Gospel to Jesus Christ (John 1:1, 'the Word'). It has affinities with the Hebrew 'Wisdom' (see Prov. 8, especially ver. 22-30; cf. *Wisdom of Solomon* 7:25 f.), and also with the *Memra* (i.e., word) which in the Jewish Targums ranks as the agent of God in creation. The decisive step of identifying the Logos not only with the Messiah, but with an actual person, Jesus Christ, was taken by St. John. See Liddon's *Bampton Lectures* (1866), Heinze's *Die Lehre vom Logos in der Gr. Phil.* (1872), Drummond's *Philō Judæus* (1888), and Réville's *La Doctrine du Logos* (1881).

Logroño. (1.) Inland prov. of N. Spain, consisting of a mountainous district s. of river Ebro. Area, 1,945 sq. m. It produces cereals, but is especially famous for its red wines. Pop. 186,223. (2.) (Anc. *Lucronius*), walled tn. and cap. of above prov., on the Ebro, 30 m. s.e. of Vitoria; is the centre of the Rioja wine district. Pop. (1901) 18,866.

Logwood is obtained from the logwood tree (*Hæmatoxylon campechianum*), which is indigenous to Central America. The heartwood is imported, and is cut into chips, heaped together, moistened, and exposed to the air, when a process of fermentation takes place, which darkens the wood and gives it a beetle-green lustre, due to the formation of a colouring matter, hæmatein, which can be extracted by hot water. Logwood is largely used as a red dye, in the manufacture of inks, and as an astringent to control diarrhoea. See DYEING.

Lohardaga, cap. of dist. of same name in Chota Nagpur div., Bengal, India, 155 m. s.s.w. of Patna. Pop. of dist. 1,188,562.

Loharu, cap. of native state, India, in the s.e. of the Punjab, 85 m. w.s.w. of Delhi. Area, 226 sq. m. Pop. 15,233.

Lohengrin, son of Parzifal, and one of the knights of the Holy Grail, whose adventures form the subject of a 13th-century poetical romance. The legend runs that he was conveyed in a car drawn by a swan to Mainz to rescue Elsa, daughter of the Duke of Brabant. After fighting her enemy, Telramund, he married Elsa. His wife, in spite of his dissuasion, endeavoured to ascertain his previous history. He gave the information, and at once the swan and car appeared, and he returned to the Grail. On this story Wagner founded his opera *Lohengrin* (1848).

Loigny, vil. in dep. Eure-et-Loir, France, 25 m. S.E. of Chartres, the site of the battle of Loigny-Poupry, Dec. 2, 1870, when the French were defeated by the Germans under the Grand-

tière, to enable vessels to reach Nantes (31 m.) without navigating the shallow estuary. The Canal Latéral à la Loire accompanies the river all the way from Roanne to Briare, from which it proceeds to the Seine. The Loire is also connected by canal with the Saône. (2.) Department of central France, formed from parts of the ancient Lyonnais and Forez, is bounded on the N.W. and N. by Allier and Saône-et-Loire, and on the S. by Haute-Loire and Ardèche. It is 1,838 sq. m. in area, and is largely mountainous. The department is drained centrally and towards the N. by the Loire and its tributaries, and in the S.E. by the tributaries of the Rhone. The coal field is one of the richest in France, and iron and lead are mined in large quantities. Hard-

is generally flat. Salt is largely manufactured from the coastal marshes. South of the Loire, in the Pays du Retz, lies the Lake of Grand Lieu. Cereals, vines, flax, and fruit are cultivated. The chief industries are the manufacture of hemp and linen, and of machinery, especially at Nantes and St. Nazaire. In the latter there is also shipbuilding. There are five arrondissements—Nantes (cap.), Ancenis, Châteaubriant, Paimbœuf, and St. Nazaire. Pop. (1901) 664,971.

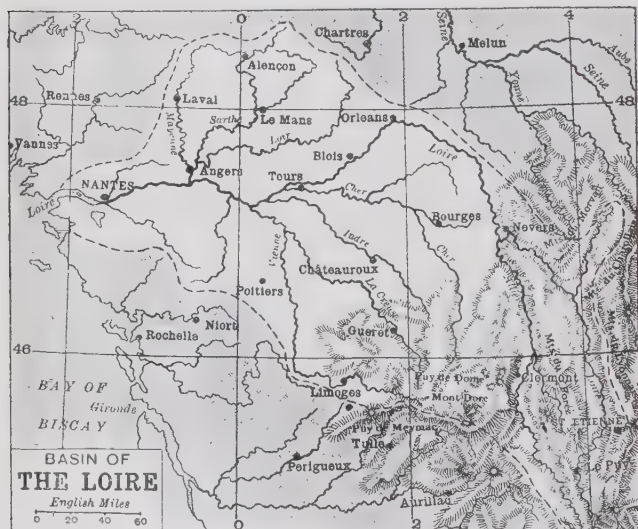
Loiret, dep. of central France, formed from ancient Orléanais and Berry, and lying N.E. of Loir-et-Cher and W. of Yonne. Area, 2,614 sq. m. The S. portion is drained by the Loire and its tributaries, the N. by the Loing and Essonne, towards the Seine. The plateau of Orleans, occupying the W. and N.W. part of the department, comprises a large tract of land of great fertility. Wheat, sugar beet, and the vine are cultivated. Distilling and sugar-refining are carried on, and hosiery and porcelain are manufactured. There are four arrondissements—Orleans (cap.), Gien, Montargis, and Pithiviers. Pop. (1901) 366,660.

Loir-et-Cher, dep. of central France, formerly part of Orléanais and Touraine, lying between Eure-et-Loir on the N. and Indre on the S. Area, 2,478 sq. m., consisting mostly of plain. The N. is drained by the Loir, the centre by the Loire, and the S. by the Cher. Forests cover one-sixth of the surface. Cereals and fruit are cultivated; other industries are sheep and poultry rearing, bee-keeping; woollens, cottons, leather and glass manufactures. There are three arrondissements—Blois (cap.), Romorantin, and Vendôme. Pop. (1901) 275,538.

Loja. (1.) City, prov. Granada, Spain, 30 m. W. of Granada, romantically situated in a valley on the river Genil. The town contains the ruins of a Moorish castle, several notable churches, and a modern palace of the Duke of Valencia. There is some trade in grain and cattle. Pop. (1900) 19,143. (2.) **LOJA**, or **LOXA**, cap. of prov. of same name, Ecuador, S. America, beautifully situated, at an altitude of 6,900 ft., near the S. frontier. It has a cathedral, founded in 1546. The province is famous for its cinchona bark. Pop. 10,000.

Lokeren, tn., prov. E. Flanders, Belgium, 11 m. N.E. of Ghent; manufactures cottons, lace, and tobacco. Pop. 21,000.

Lokhvitsa, tn., Poltava gov., S.W. Russia, 105 m. N.W. of Poltava city, at junction of Lokhvitsa with Sula; manufactures cloth and sugar, and has trade in horses and cattle. Pop. 9,000.



duke of Mecklenburg. This victory led to the fall of Orleans.

Loire. (1.) The longest river in France, rises in Mt. Gerbier-de-Jonc, Cevennes, in dep. Ardèche, and flows N. and N.W., S.W., and finally W., reaching the Bay of Biscay between St. Nazaire and Paimbœuf, after a course of 620 m. It passes the towns of Roanne, Nevers, Orleans, Blois, Amboise, Tours, Ancenis, and Nantes, and receives on the R. bk. the Arroux and the Maine, on the L. bk. the Allier, Cher, Indre, Vienne, Thouet, and Sèvre Nantaise. It is subject to frequent floods, and dikes have been constructed in some parts to prevent destructive inundations. The Maritime Canal of the Loire was opened in 1892, between Paimbœuf and Mar-

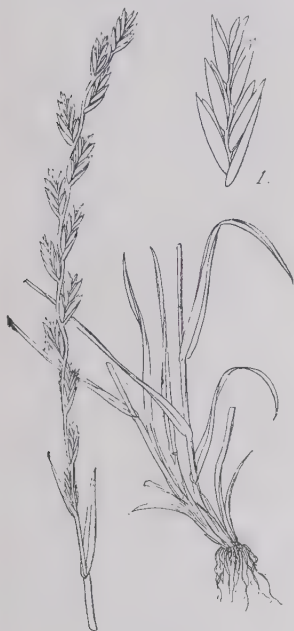
ware, cutlery, machinery, ribbons, and muslins are manufactured, and the silk industry is important. The mineral springs of St. Alban, St. Galmier, and Sail-sous-Couzan attract many visitors. There are three arrondissements—St. Etienne (cap. since 1855); Montbrison, in the W.; and Roanne, in the N. Pop. 647,633.

Loire, HAUTE. See HAUTE-LOIRE.

Loire - Inférieure, maritime dep. of W. France, formed from part of ancient Brittany, and lying between the Bay of Biscay in the W. and the dep. of Maine-et-Loire in the E. The department is 2,693 sq. m. in area, and is drained from E. to W. by the Loire and its tributaries, the Sèvre-Nantaise and the Erdre; the N. portion drains to the Vilaine. The surface

Loki, one of the principal beings in Scandinavian mythology, possessing great physical beauty, combined with exceptional ability and cunning, which frequently perplexed the other deities. He may be regarded as the Scandinavian 'spirit of evil,' or Norse Mephistopheles. See **BALDER**.

Lokman, the name of two persons in Arabic tradition. The first was said to have made the Ma'rib dike, and in reward for his virtues to have been dowered with the lives of seven vultures, these birds being said each to live eighty years. The other is variously described as an Abyssinian slave of David's time, or a relative of Job, or is identified with Balaam, the names possessing the same root meaning, 'swallow' or 'devourer.' To him were ascribed fables, proverbs, and poems. See *Derenbourg's Fables de Lokman le Sage* (1850), and *The Thousand Nights and a Night*, edited by Lady Burton.



Lolium italicum.

1. Spikelet.

Lolium, a genus of grasses, tribe Hordeae, of which, perhaps, the most valuable member is the Italian rye grass (*L. italicum*), a variety of our native *L. perenne*. The darnel (*L. temulentum*) is said to be the 'tares' referred to in the gospels.

Lollards, THE, a religious body which, in the 13th or 14th century, opposed the doctrines and customs of the Church of Rome. The

term Lollard was applied in the latter half of the 14th century to the followers of Wycliffe. The Lollards soon outdistanced Wycliffe; and John of Gaunt, Wycliffe's most zealous defender, showed no sympathy with their aspirations. When Henry of Lancaster deposed Richard (1399), he ascended the throne with the full concurrence of the church. Henceforth the Lancastrians assisted the church to suppress Lollardism. Henry IV. passed the statute *De Heretico Comburendo*, and William Sawtré was one of the first Lollard victims (1401). But Henry was unable to suppress

Lolos, or **NESUS**, an aboriginal tribe in China, inhabiting the mountainous country Ta-liang-shan, lying between the Yang-tse-kiang and the Chien-chang valley. They are now nearly all subject to Chinese rule. In features, dress, and language they are quite distinct from the Chinese. See Hosié's *Three Years in W. China* (2nd ed. 1897) and Garnier's *Voyage en Indo-Chine* (1873).

Lomaria, a genus of ferns (order Polypodiaceae), with dimorphous fronds, and linear sori occupying the space between the midrib and the edge of the frond.



Lombardy.

the Lollard movement. One of the most distinguished leaders of the movement in the later years of Henry IV.'s reign, and in the early years of Henry V., was Sir John Oldcastle, who became Lord Cobham. In spite of the orthodox policy of Henry VI., Lollardism smouldered on, representing the general dissatisfaction with the papacy. In Tudor times Lollard opinions gradually triumphed, and in 1547, the first year of Edward VI.'s reign, all statutes against Lollardism were repealed. See *Apology for the Lollards* (1842); Brown's *The Leader of the Lollards* (1848); Trevelyan's *England in the Age of Wycliffe* (new ed. 1904), Powell and Trevelyan's *The Peasants' Rising and the Lollards* (1899); and Poole's *Wycliffe and Movement for Reform* (1889).

L. spicant is a British species (also known as *Blechnum boreale*, or 'hard fern'), of which there are numerous varieties, many worth cultivating. Among other species are the half-hardy *L. pumila*, from New Zealand; and the greenhouse *L. nigra* (New Zealand), *L. procera* (W. Indies), and *L. gibba* (New California).

Lomatia, a genus of sub-tropical shrubs and trees, order Proteaceae, chiefly grown for the beauty of their leaves. *L. silatifolia* has leaves which are green above and glaucous below, and bears long racemes of white flowers; *L. tinctoria* has beautiful pinnate leaves; and *L. ferruginea* has leaves which are dark green above and downy below. A soil of peat and light loam is suitable.

Lomatophyllum, a genus of succulent plants, order Liliaceæ. They bear fleshy leaves in a cluster at the summits of the stems. *L. aloiflorum*, the Bourbon aloe, with broad leaves and yellow and brown flowers, is sometimes cultivated in greenhouses.

Lombard, PETER (c. 1100-60), theologian, bishop of Paris, was born at Novara, Lombardy. Edu-

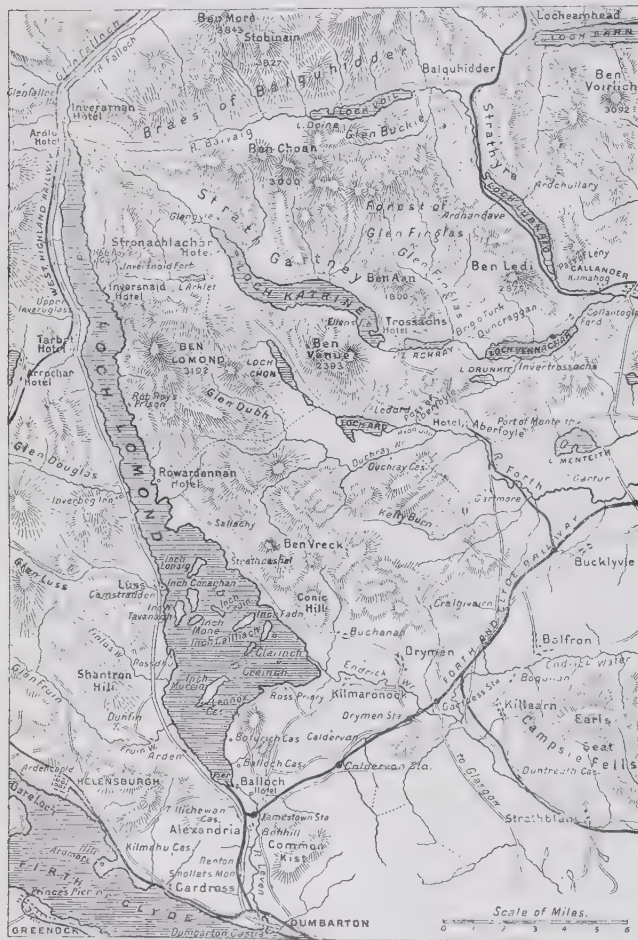
Lombards, or **LONGOBARDI**, a German people who, at the beginning of the Christian era, settled on the Lower Elbe, and in the 5th century seem to have migrated to the regions of the Danube, where they became converts to Arianism. Throwing off the yoke of the Herulæ (490), under whose domination they had fallen, they destroyed the Gepidæ (566).

dom to a province of his own empire (774), the Lombards thereafter becoming merged in the general Italian population. See *Les Lombardes en France* (1892).

LOMBARDS is also the name of those merchants from the commercial cities of N. Italy who acted as bankers, or rather money-lenders, to the kings of England from the time of Henry III. (1216-72) to the time of Edward III. (1327-77). They came first to England as the financial agents of the popes, who had many dues to collect; and probably began the business of money-lending with those from whom they were demanding payment of the pope's tenths. After the expulsion of the Jews from England (1290) the Edwards borrowed largely from the Lombards. Edward II. paid off his father's debts (£56,500) to the Frescobaldi, £1,800 to the Bellardi, and £4,600 to the Bardi. Edward III. borrowed so freely that these Lombard bankers began to look to their securities; but in spite of their caution, the chief firms, the Bardi and the Peruzzi, became bankrupt—Edward III. owing the former 900,000 and the latter 600,000 crowns. During the following centuries we find English merchants taking their place alike as traders and as money-lenders. The Lombards had offices in the street which still bears their name. Their usurious transactions caused their expulsion from the kingdom by Queen Elizabeth. See Cunningham's *Growth of English Industry and Commerce* (1896).

Lombardy, div. of N. Italy, being the central part of the long depression between the Alps and the Apennines, drained by the Po and its tributaries, and having Piedmont on the w. and Venetia on the e. It comprises the provinces of Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia, and Sondrio, and covers an area of 9,297 sq. m. Much of it is very fertile and extensively irrigated, yielding maize, wheat, rice, flax, and grapes. The division is noted for its silk industry. Iron and zinc ores are mined. The chief city is Milan. Pop. (1901) 4,282,728.

Lombok, one of the Lesser Sunda Is., forming with Bali on the w. a residency of the Dutch E. Indies. Area, about 2,000 sq. m. It is volcanic in origin and mountainous in character, the highest peak being Sangkarejan (12,460 ft.). The valleys are fertile, and yield rice, maize, tobacco, coffee, indigo, and sugarcane; cattle and horses are bred. Mataram is the capital; Ampenan on the w. coast is the seaport. Pop. estimated at over 600,000, chiefly Sassaks and Balinese.



Loch Lomond, the 'Queen of Scottish Lakes.'

cated at Bologna, he went to France, where, through the influence of Bernard of Clairvaux, he obtained a professorship of theology at Paris, and was appointed to the bishopric in 1159. He became famous through his *Sententiarum Libri Quatuor*, a collection of extracts from the fathers. His *Works*, edited by Aleaume, were published (1546).

took possession of Pannonia, and under Alboin invaded Italy (568). There they easily established themselves in the northern half, with Pavia as their capital. They were induced by the support of Gregory the Great and by their remarkable queen Theodelinda to accept the Roman Catholic form of the Christian faith. Charlemagne reduced the Lombard king-

Lombroso, CESARE (1836), Italian criminologist, was born at Verona. He was appointed (1862) professor of mental diseases at Pavia University, where he instituted an asylum for the insane, a psychiatric museum, and a series of researches in the application of exact scientific methods to the study of insanity. He subsequently became director of a lunatic asylum at Pesaro, and finally received his present appointment as professor of forensic medicine and psychiatry at Turin. His writings on insanity and criminology form a long list; but the two works which have done more, perhaps, than any other to bring him fame are *L'Uomo delinquente* (1876-89), and *L'Uomo di genio* (1889; Eng. trans. 1891). The views and investigations of Lombroso, and his doctrine of a 'criminal type,' have given him a world-wide reputation, have profoundly influenced the study of the whole subject of insanity and criminology, and considerably affected the administration of continental prisons and lunatic asylums.

Lomond, LOCH, between Dumbartonshire and Stirlingshire, Scotland, which from its size and picturesqueness is justly entitled the 'queen of Scottish lakes.' It covers an area of 2,709 sq. m., is 21 m. long, and in breadth varies from 5 m. to 1 m., the southern portion being wide and island-studded. Ben Lomond overlooks it from the E., and the double-peaked Ben Voirlach rises from its N.W. shore. It drains to the Clyde by the Leven at the southern end. Of the thirty wooded islets, the best known are Inchmurrin, Inchmoan, Incheallach, and Inchlonaig, the first containing the ruins of Lennox Castle. On the eastern shores are Balmaha, Rowardennan (for Ben Lomond), and Inversnaid (the centre of the Rob Roy country, famous for its falls, and the reputed scene of Wordsworth's vision of *A Highland Girl*); on the W. are Luss, Tarbet, and in the N.W. Ardlui.

Lom-Palanka, tn., capital of Lom-Palanka, Bulgaria, at the junction of the Lom and Danube. It is a steamship station, and the chief mercantile emporium for N.W. Bulgaria. Pop. over 8,000.

Lomza (Russian *Lomja*). (1.) Province of Russian Poland, W. Russia, bounded on the N. by Prussia and Suwalki government, on the E. by Grodno, on the S. by Siedlec and Warsaw, and on the W. by Plock. Area, 4,667 sq. m.; pop. 585,781 (mostly Roman Catholics). (2.) Town, cap. of above prov., 75 m. N.E. of Warsaw, on l. bk. of Narev. Pop. (1897) 26,075.

London (lat. 51° 30' 48" N.; long. 5° 48' W.), the largest city in the world, and the capital of England and of the British Empire, stands on both banks of the river Thames, which is both tidal and navigable, and which at London Bridge (where it narrows) measures 325 yds. across. London may be taken as distant 50 m. from the sea, for the Port of London extends from London Bridge to Queenborough on Sheppey I. (50 m.), though the strict limits are from London Bridge to Blackwall. The Thames Conservancy, however, has jurisdiction from the Nore to Oxford. The Port of London being thus more or less indeterminate, London itself is even more so. It stretches its ever-growing tentacles into the four counties of Essex, Middlesex, Surrey, and Kent. Within its various boundaries London may be defined in the following ways:—(1.) The Metropolitan Police District, or 'GREATER LONDON,' which extends over a radius of 15 m. from Charing Cross, and has an area of upwards of 692 sq. m., a population (1904) of 6,907,756, and a rateable value (1903-4) of £48,570,769. (2.) Registration, or 'INNER LONDON,' coterminous with the administrative County of London. This is bounded roughly by Highgate and Hampstead on the N., by Woolwich on the S.E. and Blackwall on the E., by Sydenham on the S., and on the W. by Hammersmith and Putney. Inner London covers 117 sq. m., and contains a population (1904) of 4,648,950, and a rateable value of £41,078,113. (3.) The CITY OF LONDON within municipal and parliamentary limits: area, 673 ac.; a sleeping population of caretakers (1901) of 26,923 (in 1861, 112,013); the day or working population rises to over 1,000,000. In addition to these three there is the Central Criminal Court district, with an area of 420 sq. m., and a population (1901) of 6,101,664.

The CITY OF LONDON proper lies on the N. bank of the river, stretching between the Thames and Finsbury, and E. and W. from the Tower to Temple Bar. Both in size and shape it corresponds very nearly to the ancient Roman London, even as its chief thoroughfares, Cannon Street, Cheapside, Bishopsgate Street, etc., themselves run over the sites of Roman streets. Four bridges—Blackfriars, Southwark, London, and the Tower (the last built on the bascule principle—i.e. a balanced bridge which can move up or down)—connect the City with the Borough or Southwark on the S. side. Along the river front are strung out various steamer-piers, Queenhithe Dock, the steam-packet wharf by Lon-

don Bridge, Billingsgate Fish Market, the Custom-House, and the Tower.

Within the City precincts stand famous buildings and monuments too numerous to detail. Among them, however, may be mentioned the Guildhall (1411, rebuilt 1789) in King Street, off Cheapside; St. Paul's Cathedral; the Mansion House, the official residence of the Lord Mayor; the Bank of England; the General Post Office at St. Martin's-le-Grand; St. Bartholomew's Church in Smithfield, the finest example of Norman architecture in London, if not in Great Britain; and the Monument (202 ft. high) to commemorate the Great Fire. For the City markets see below—MARKETS.

The topography of the City is very simple. Its main arterial thoroughfares—Upper Thames Street, Cannon Street, Cheapside with the Poultry, and London Wall (which defines part of the course of the old wall round the City)—run in a parallel E. and W. direction, intersected by numerous cross streets forming roughly rectangular blocks. At either end of Cheapside-Poultry there is a nodus whence radiate several streets in many directions. The Poultry end is the most important, for thence branch off (past the Bank, the Royal Exchange, and the Mansion House) Princes Street, Threadneedle Street, Cornhill, Lombard Street, and King William Street—the focus of London's and the world's financial activity. Cheapside, the 'Golden Cheapside' of Herrick, still the main central artery of the City, no longer enjoys its old pre-eminence as a centre of commerce and finance. That has shifted eastwards, just as the shipping interest has settled itself chiefly in Leadenhall Street and Fenchurch Street. But, as of old, Lombard Street is still one of the main seats of the banking industry; large mercers still have their shops in St. Paul's Churchyard; Paternoster Row continues to be the quarter of book publishers; and Fleet Street (the home of journalism) maintains its reputation for taverns, which have been its special feature for centuries. One of the most noted of the Fleet Street taverns is the Cheshire Cheese, once a favourite resort of Dr. Johnson, whose accustomed seat is still pointed out.

Though the City of London was the nucleus of the metropolis, and is still the chief centre of commercial and financial activity, the kernel, both in point of extent and complexity of interests, is now overwhelmingly surpassed by the shell—that is, by the County of London.

THE COUNTY OF LONDON was established by the Local Government Act of 1888, and covers an area of 117 sq. m., with boundaries coterminous with the area over which, prior to 1889, the Metropolitan Board of Works exercised jurisdiction. It should, however, be noted that the London Government Act of 1899 made some slight re-arrangements of the county boundaries, the principal being that Penge in the S. was taken out of, and South Hornsey in the N. was added to, London. The boundaries have already been indicated. The following is a list, with statistics, of the twenty-eight boroughs of which the County of London consists:—

with its engineering shops, telegraph works, and chemical works, contains Greenwich Hospital for sailors, naval schools in connection with it, and the Royal Observatory. At Greenwich, too, is a huge power station to supply electricity to all the S. London tramways operated by the County Council. *Deptford* is no longer the site of the royal dockyard (closed in 1869), where Drake received his knighthood, but possesses the Royal Victoria Naval Victualling Yard, and also the London Corporation's foreign cattle-market. *Deptford* devotes itself to marine engineering. *Bermundsey*, with its extensive tan-yards and wharves, is one of the lowest-lying districts of S. London,

Lambeth, too, stand Bedlam, or Bethlem Royal Hospital for the Insane (originally founded 1247 as a priory at Bishopsgate), and one of London's two great cricket grounds, Kennington Oval. The people of *Battersea* are fortunate in the possession of *Battersea Park* (185 acres), and in their easy access to Clapham Common on the south. (See *BATTERSEA*.) Last of all the South London boroughs is *Wandsworth*, the largest of the twenty-eight, which ends in the parish of Putney.

The principal bridges and tunnels connecting London S. of the river with that of the N. bank are *Blackwall Tunnel*, between Greenwich and Blackwall (cost £1,500,000, used by 4,148,590 pas-

	Area in Acres.	Pop. (1901).	Valuation (£)		Area in Acres.	Pop. (1901).	Valuation (£)
Battersea.....	2,169	168,907	1,031,769	Kensington.....	2,188	176,628	2,304,595
Bermundsey.....	1,506	130,760	925,000	Lambeth.....	4,105	301,895	1,908,740
Bethnal Green.....	755	129,680	531,942	Lewisham.....	7,011	127,497	995,785
Camberwell.....	4,450	259,339	1,297,572	Paddington.....	1,400	143,977	1,473,043
Chelsea.....	650	73,842	822,293	Poplar.....	2,333	168,822	800,675
Deptford.....	1,574	110,398	602,831	St. Marylebone.....	1,506	133,301	1,749,570
Finsbury.....	588	101,463	980,428	St. Pancras.....	2,672	235,317	1,800,201
Fulham.....	1,701	137,289	1,000,000	Shoreditch.....	648	118,637	768,276
Greenwich.....	3,837	95,770	603,542	Southwark.....	1,119	206,180	1,269,276
Hackney.....	3,299	219,272	1,190,930	Stepney.....	1,765	298,000	1,433,439
Hammersmith.....	2,286	112,239	750,508	Stoke Newington.....	868	51,247	846,131
Hampstead.....	2,248	81,942	1,037,457	Wandsworth.....	9,104	232,032	1,713,723
Holborn.....	409	59,405	972,415	Westminster, City of.....	2,555	183,011	5,516,725
Islington.....	3,109	334,991	1,941,654	Woolwich.....	8,296	117,178	732,445

Of these, ten lie to the south of the Thames in the geographical counties of Surrey and Kent—viz. (proceeding along the river from W. to E.) *Wandsworth*, *Battersea*, *Lambeth*, *Southwark*, *Bermundsey*, *Deptford*, *Greenwich*, *Woolwich* (part—North Woolwich—in Essex), and two inland boroughs, *Camberwell* and *Lewisham*. The two latter and the inland parts of the riverine boroughs are principally residential, and are inhabited by those who six days a week hurry northwards over the Thames. *Lewisham* still contains considerable stretches of open country or fields—in particular the high-lying, open, golfing common of *Blackheath*, near *Greenwich Park*, where golf was first played in England, probably about the year 1608. *Camberwell*, densely built over, contains *Dulwich College* (founded by Edward Alleyn, 1619), and the magnificent but little frequented *Dulwich Picture Gallery*. See *DULWICH*.

Coming now to the boroughs bordering on the river, the following is the order from E. to W.:—*Woolwich*, which includes *Eltham* and *Plumstead*, is notable for the possession of the Royal Arsenal and the Royal Military Academy (for the training of R.E. and R.A. officers), the former employing some 12,000 men. *Greenwich*,

and the cellars of some streets adjoining the river are occasionally flooded by a high tide. *Rotherhithe*, at the N.E. end of *Bermundsey*, contains the Surrey and Commercial Docks (350 acres), which import grain and timber, and which keep in touch with the heart of S. London by the Grand Surrey Canal. *Southwark*, or the Borough, is a borough of dingy, mean streets, with a river-front lined with great warehouses and busy wharves. It is thickly covered with factories. *Guy's Hospital* stands in the High Street of the Borough. *Bankside*, *Southwark*, was, in Shakespeare's day, the home of the amusement-mongers of London, for here were the bull-rings, the bear-pits, the notorious 'Holland's Leaguer,' and the Globe, Rose, Hope, and Swan Theatres. The Borough is the seat of the largest hop-market in the world. Next in order comes the borough of *Lambeth*, which faces *Westminster*, and reaches down from the river almost to the farthest southern confines of London County. It contains the district of *Brixton*. *Lambeth Palace*, which fronts the river, has been the chief official residence of the archbishops of *Canterbury* since 1197. To the N., opposite the Houses of Parliament, stands *St. Thomas's Hospital* (removed to that site in 1870). In

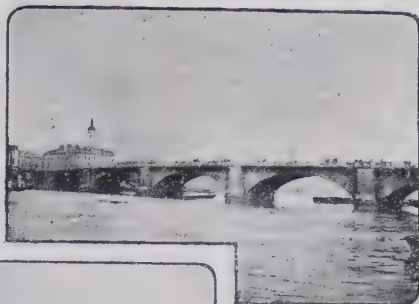
sengers and 862,843 vehicles in 1903); a second Thames tunnel scheme between *Rotherhithe* and *Shadwell* has received parliamentary sanction; *Deptford Subway*, between *Deptford* and *Millwall* (used by 3,972,843 passengers in 1903); the *Thames Tunnel* (finished 1843), between *Rotherhithe* and *Wapping*; the *Tower Bridge*, between *Bermundsey* and the *Tower* (opened 1894); the *City and Southwark Subway*; *London Bridge*, with a cable subway on either side of it; the *South-Eastern Railway Bridge*; *Southwark Bridge*; *Blackfriars Bridge*, with a South-Eastern Ry. bridge on one side, and the tunnel of the *City and Waterloo* electric tube on the other; *Waterloo Bridge*; *Charing Cross Railway and Foot Bridge*, with the *Baker Street and Waterloo* tube tunnel beside it; *Westminster Bridge*; *Lambeth Bridge*; *Vauxhall Bridge*; *Victoria Bridge*, from *Battersea* to *Chelsea*, with the L.B. & S.C.'s railway bridge beside it; *Albert Bridge*; *Battersea Bridge*; *Battersea Railway Bridge* of the W. London Extension Ry.; *Wandsworth Bridge* into *Fulham*; *Putney Bridge*, with a railway and foot bridge beside it; and *Hammersmith Bridge*.

South London possesses the following parks and commons:—*Plumstead Common*, *Woolwich*

1



2



3

4



5



6



7



8



9



London Bridges.

1. Tower Bridge. 2. London Bridge. 3. Southwark Bridge. 4. Blackfriars Bridge. 5. Waterloo Bridge. 6. Westminster Bridge.
7. Lambeth Bridge. 8. Victoria Bridge. 9. Albert Bridge.

Common, Greenwich Park, Blackheath, Deptford Park, Southwark Park, Lambeth Palace Gardens (the private property of the archbishop, but thrown open to the public on certain occasions), *Kennington Park, Vauxhall Park, Camberwell New Park, Battersea Park, Brockwell Park, Clapham Common, Wandsworth Common*, and a number of other small parks and commons in the southern districts of the boroughs of Wandsworth, Lambeth, and Camberwell.

The London boroughs on the N. side of the Thames number eighteen. Five lie on the N.—*viz.* (going from w. to e.) *Hampstead, St. Pancras, Islington, Stoke Newington, and Hackney*; six about on the river—*Hammersmith, Fulham, Chelsea, Westminster, Stepney, and Poplar*; and seven form the central band—*Kensington, Paddington, St. Marylebone, Holborn, Finsbury, Shoreditch, and Bethnal Green*.

The northern districts of London lie comparatively high on the w. (highest point 450 ft.), but gradually slope down to the low-lying Hackney marshes around the Lea R. on the e. Celebrated at one time for its medicinal waters, *Hampstead* continues a favourite residential district and also a resort of holiday makers, who on public holidays throng the famous Heath (240 ac.). Next to *Hampstead* lies *St. Pancras*, which stretches from the maze of dingy streets which surrounds the three great railway stations of *St. Pancras (M.R.)*, *King's Cross (G.N.R.)*, and *Euston (L. & N.W.R.)*, through *Camden Town* and *Kentish Town* (an old prebendal manor, *Kentish* being a corruption of 'Cantlers,' or 'Cantelupe's') to the breezy slopes of *Highgate*. *Islington*, which includes *Lower and Upper Holloway* and *Hornsey*, contains a number of religious, philanthropic, and educational institutions, and also the *Agricultural Hall* (capable of holding 30,000 people), where cattle and horse shows, military tournaments, etc., are held. On the N.E. of *Islington* lies the small borough of *Stoke Newington*, next to which is *Hackney*, which, though densely covered with working-men's houses between *Hackney Downs* and *Hackney Canal*, can yet boast of large stretches of open field and common land towards the river Lea. Immediately s. of *Hackney* lie two of the seven central boroughs—*Bethnal Green* and *Shoreditch*. The former is a wilderness of lower-class houses and factories, but contains the priceless boon of *Victoria Park* (217 ac.). *Shoreditch* principally consists of the densely-packed parishes of *Haggerston* and *Hoxton*, and reaches down to the

northern borders of the City. Westward lie the parishes of *Finsbury*—*St. Luke's* and *Clerkenwell*. *Clerkenwell* (once the clerks' or priests' well of pure clear water which formed the chief supply of the district) is the headquarters of the watch and clock making industry, and is also occupied by a number of printing-houses. Here stands the *Charterhouse*, on the site of an old Carthusian monastery. In 1872 the school was transferred to *Godalming* in *Surrey*, but the building is still used as an educational institution by the *Merchant Taylors' Co.*

Holborn is intersected by the thoroughfare of the same name, across which once ran the little river called the *Holbourne* in its upper and the *Fleet* in its lower course. On either side of the thoroughfare lie some of the Inns of Court—*Gray's Inn* to the N., associated with the name of *Francis Bacon*, *Lincoln's Inn* and its *Fields* on the s.; and in *Holborn* itself stands the finest example of a 'half-timbered' house in London—*Staple Inn*. In the district of *Bloomsbury*, N. of *New Oxford Street* (which is a continuation of *Holborn*), lies the *British Museum*. The street names round the *Museum*—*Chenies Street*, *Great Russell Street*, *Bedford Place*, *Tavistock Square* (where *Charles Dickens* lived)—are reminiscent of the *Bedford* family, to which a great part of *Bloomsbury* still belongs.

Sharply divided from *Westminster* on the s. by *Oxford Street* (named after *Edward Harley*, second *Earl of Oxford*), lies the large parish (anciently known as *Tyburn*) of *St. Marylebone*, and the still larger borough of the same name. The *brook Tyburn* ran through it, and the parish derives its name from the erection of a church dedicated to *St. Mary le bourne*—*i.e.* at the side of the brook. At the foot of the great *Roman highway*, which now, under the name of *Edgware Road*, bounds *St. Marylebone* on the w., stood *Tyburn* gallows. *Marylebone* was the residence of many celebrities, including *Gibbon*, *Charles Wesley*, *Hoyle* (an early authority on whist), and *Hogarth*. *Madame Tussaud's* great exhibition is in the *Marylebone Road*. The ancient manor of *St. John's Wood* in the w. takes its name from its original possessors, the *Knights of St. John*; in it lies the famous *Lord's* cricket ground. *Marylebone* also possesses *Regent's Park* (472 ac.), the largest of the London parks, containing the *Zoological* and *Royal Botanic Gardens*. Just north of the park is *Primrose Hill*, the only one of the little hills of N. London that is not covered with houses.

Crossing *Edgware Road*, we

enter the borough of *Paddington*, which contains the ancient manor of *Westbourne*, so called after the little stream which once fed the *Serpentine River* in *Hyde Park*. South-west of *Paddington* is *Kensington*, at its southern end one of the finest and richest residential districts of London. Here are the public pleasure grounds of *Kensington Gardens* (200 ac.), which contain the old palace of *Kensington*, purchased by *William III.* from the *Earl of Nottingham* in 1689, and given to the nation in 1899. On the s. side of the gardens is the *Albert Memorial* (1872), and opposite is the *Albert Hall* (1867-71), an enormous circular building used as a concert hall, and capable of seating some 10,000 persons. In the near vicinity are *Olympia* (an exhibition building), the *S. Kensington* and *Royal Natural History Museums*, and the *Imperial Institute* (opened 1893). To the east of the *Imperial Institute* is the *Brompton* district. *Earl's Court* is a district of West *Kensington*. Vying in historical importance with *Kensington Palace* is the quaint Elizabethan building of *Holland House* (1607), where dwelt at different times *Fairfax*, the parliamentary general; *Addison*, who died there; *Penn of Pennsylvania*; and *Charles James Fox*, through whose occupancy the house became a great Whig meeting-place up to the beginning of the 19th century.

The boundary borough of *London* county on the w. is that of *Hammersmith*, which touches the *Harrow* road on the N., and southward abuts on a bend of the river crossed by a fine suspension bridge. The *Uxbridge* road runs eastward through *Hammersmith* to *Acton* and *Ealing*. Next in order along the river-bank is the borough of *Fulham*. Here, on the river, stands *Fulham Palace*, the residence of the bishop of *London*, said to be the oldest inhabited house in *England*. A little farther down the river is the fashionable *Hurlingham Park*, the headquarters of pigeon-shooting and polo-playing in *England*. The next borough is that of *Chelsea*. Its eastern portion, known as *Pimlico*, at the beginning of the 19th century was a marshy waste where snipe were shot; while *Chelsea* parish itself was, in the middle of the 18th century, only an outlying village. *Chelsea (Chesil-ey, 'the shingly island')* has been fenced from the river by an embankment between the *Victoria* and *Battersea Bridges*, and on the embankment stands *Chelsea Hospital* for disabled soldiers. *Chelsea* is still, as it has long been, a favourite residential quarter. Here, in the 16th century, lived *Sir Thomas*

More, Princess Elizabeth, Anne of Cleves, and Queen Catherine Parr; later, Walpole, Steele, Swift (who lived opposite Dean Atterbury's house, and used to drive into London by 'the six-penny stage'), and Sir Hans Sloane, whose name is commemorated in Sloane Square and Sloane Street; and, later still, Leigh Hunt, Rossetti, George Eliot, and Carlyle.

The next and greatest of the London boroughs is the *City of Westminster*. It is the richest, architecturally the finest, and historically by far the most interesting, of any part of London outside the City. Beginning at Temple Bar (now marked by a griffin on a pedestal) in the Strand, which is the boundary between the two cities of London and Westminster, we plunge at once into the stateliest part of the metropolis. On one side are the Royal Courts of Justice, and, fronting the Strand, the newly-constructed crescent of Aldwych, whence the thoroughfare of Kingsway furnishes a new route to Holborn; and on the other, farther down the street, are buildings and names—Essex Street, Arundel Street, Somerset House, the Savoy Hotel, Villiers Street, and Northumberland Avenue—that remind us of the great houses of princes and nobles which stretched down towards the river-front, now fenced between Blackfriars and Westminster Bridges by the noble Victoria Embankment. At the west end of the Strand is Trafalgar Square, where the Corinthian column (145 ft.) to the memory of Nelson rears aloft, its pedestal guarded by Landseer's four lions; near it is a statue of General Gordon by Thornycroft.

From Trafalgar Square debouch S.W. Pall Mall, the home of many of London's greatest clubs, and (through Spring Gardens) the Mall, which separates Marlborough House (the residence of the Prince of Wales) and the Palace of St. James from the park of the same name. Facing the w. end of the Mall stands Buckingham Palace in its spacious grounds, while across Constitution Hill to the N. spreads the beautiful Green Park (60 ac.). South from Trafalgar Square run Whitehall and Parliament Street, past the Admiralty, the Horse Guards, and other government buildings, to end in the approaches to the Houses of Parliament and Westminster Abbey. North from Trafalgar Square we can pass up the Haymarket to the great nodus of west-end London, Piccadilly Circus. Thence radiate, north-east, the recent thoroughfare of Shaftesbury Avenue, and Long Acre (the home of the carriage

and automobile trade); north, Regent Street, which, with Bond Street, New and Old, boasts London's richest shops; and west, Piccadilly. Narrow at first (though a scheme is in hand for widening it eighty feet between the Circus and Sackville Street), Piccadilly speedily becomes perhaps the finest street in London. It contains stately buildings such as Apsley, Devonshire, and Northampton Houses; for half its length it is bordered on the south by the Green Park, and ends at Hyde Park Corner, near a fine triumphal arch which is one of the entrances into Hyde Park (480 ac.), the most fashionable park in London.

Northwards and south-westwards from the w. end of Piccadilly spreads the huge parish of St. George's, Hanover Square, nearly all of which belongs to the Duke of Westminster, whose family name, Grosvenor, is of frequent occurrence in the street names. Passing over the City of London, which has already been dealt with, and continuing along the river, we arrive (in startling contrast) at the grimy region of *Stepney*, which lies south of Bethnal Green. Eastward of the old City wall lie the Tower of London and the Royal Mint (1817) on Tower Hill. The principal traffic artery of this region is Commercial Road East (s. lies Ratcliffe Highway, now St. George Street, once notorious for robbery and murder); but the main activity of the district centres in the divisions bordering the river, and known as Wapping, Shadwell, and Limehouse. Here begin the docks, the first of the series, close to the Tower, being St. Katherine's Docks (24 ac.); next, the London Docks (120 ac.); and next, Shadwell and Limehouse Basins. (See LONDON PORT.) After Limehouse begins the borough of *Poplar*, of which the southern portion consists of the low-lying Isle of Dogs, and the northern of Bromley and Bow, which border the river Lea. The name 'Bow' commemorates an arched bridge over the Lea, at or near a point where it was crossed by the 'stratford,' the ford in the Roman 'street' known as the Vicinal Way. In the Isle of Dogs are the oldest of London's docks, opened in 1802, the West India Docks (295 ac.); below them is Millwall Dock; and in Blackwall, close to where the Lea joins the Thames, the East India Dock. There the County of London ends. But farther down, on the north bank of the Thames, are the Victoria (90 ac.) and Royal Albert Docks (72 ac.); and farther yet, 26 m. below London Bridge, Tilbury Docks (76½ ac.).

To the east of Poplar (outside

Greater London) is the borough of West Ham, and still farther east (7½ m. G.E. Ry. from Fenchurch Street) the town of Barking.

The industries and manufactures of London are enormous and most varied. Some of the more special industries may be specified:—Brewing, distilling, sugar-refining. These three industries have no particular locality. Silk is manufactured in Spitalfields and Bethnal Green; tanning, soap-boiling, and candle-making are carried on in Bermondsey and Southwark; Lambeth, Millwall, and Deptford have engineering works; potteries are established at Lambeth; and Clerkenwell has an industry of watch-making and clock-making.

There are close on three hundred different authorities which control the various interests of London, and which spend on the work about £15,000,000 annually. But the supreme municipal authority is the London County Council. (See LONDON—Government.) The council's accounts for 1904-5 amounted to £9,048,414, the total county rate being 2s. 9½d. Up to the year 1904 the council has provided rehousing for 24,465 persons, and in addition to providing gymnasiums, bands, games, cheap steamboats on the Thames, etc., has since 1901 secured the following parks and open spaces for the people: Marble Hill, Twickenham (66 ac.); Eltham Park (41½ ac.); Avery Hill, Eltham (84 ac.); Hainault Forest (803 ac.); and Springfield, Clapton (82½ ac.). Thanks to these measures, and to a careful supervision of drainage and street nuisances, it has brought down the death-rate of London to 15·2 per 1,000.

The Education Committee of the County Council administers both elementary and secondary education within its area. In 1905 there were 554,646 (average attendance, 493,975) scholars on the rolls of the council schools, and 205,323 (average attendance, 175,149) on the rolls of the non-provided schools, or an elementary school population of 759,969. The expenditure on the maintenance of elementary schools for the financial year ending March 31, 1905, was £3,750,422.

HISTORY (*by the late Sir Walter Besant*).—The origin and foundation of London are, and will always continue to be, matters of dispute and controversy. My own theory entirely satisfies, in my judgment, all the difficulties of the case. It may be briefly presented as follows.

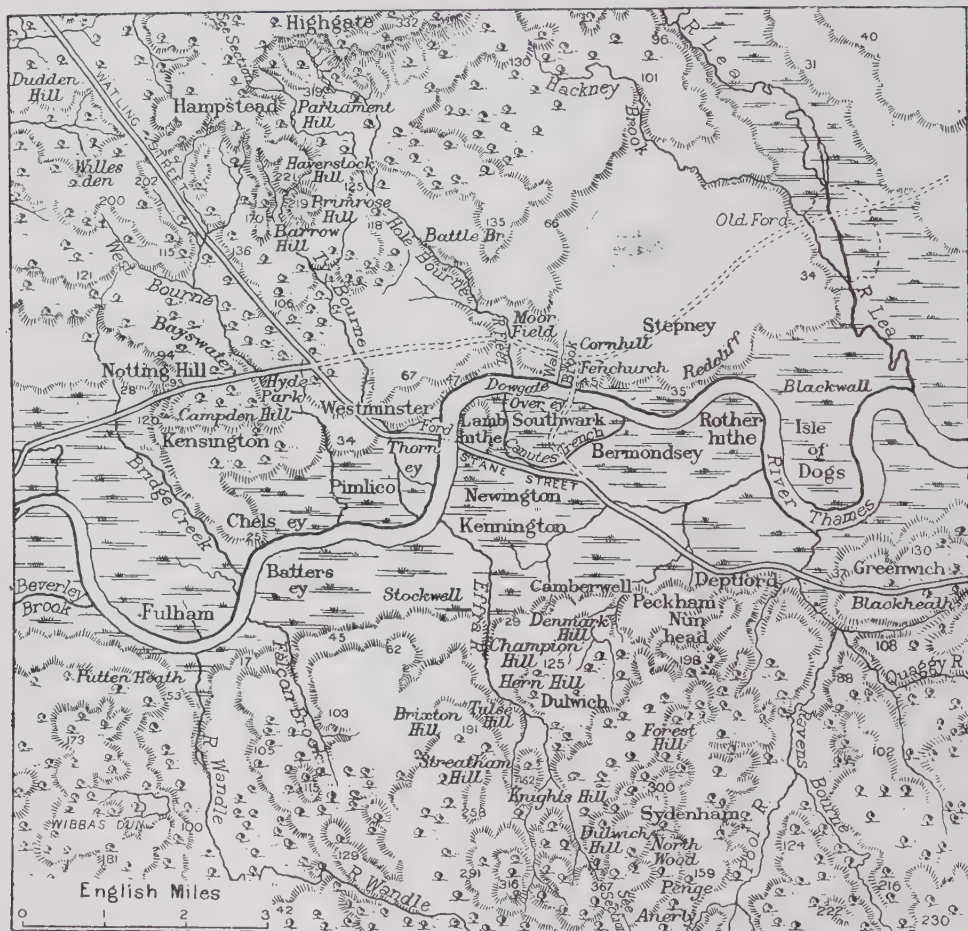
We must first consider the site of the city with respect to its local conditions, and next the site with reference to the country generally.

First, as to the local conditions.

The river on which the city stands winds in a serpentine course from Hampton to its mouth through a vast swamp, bordered on the N. and on the S. by a low cliff, the course of which may still be traced by the rising ground which has taken the place of the cliff. Thus, Battersea Rise, Clapham Rise, Brixton Rise indicate the position of the cliff on the S. side;

walls in the Isle of Dogs, a peninsula, and then continues its course eastward to the mouth. The city proper lies between the Fleet R. on the W. and the Tower of London on the E. On the S. side of the Thames stretched the marsh, four miles long from W. to E., and one mile or a mile and a half broad from N. to S. On the E. side of the city the marsh

great western swamp. On the N. of the river, beyond the cliff stretched a vast moor, intersected with small streams and dotted with ponds. The moor was quite useless for purposes of cultivation. Beyond the clearing afterwards called Iseldon or Islington began the immense forest of Middlesex and Essex, covering the whole ground between Har-



London before the Houses.

(From Stanford's Geog. Estab., London.)

The figures on this map represent the height in feet above Ordnance datum which is 12½ feet below Trinity High Water Mark.

while the slopes in Thames Street, the Haymarket, and St. James's Street, for example, show where it stood on the N. side.

The swamp is the first point of importance to note on the site of London. Reference to any map will show that at Westminster the river bends round towards the N., again at Charing Cross towards the E.; that it

lay along the riverside for two miles before it was crossed by the river Lea, which flowed through a broad marsh of its own on either bank. On the W. side the Fleet also flowed through its own mud banks into the Thames, while the present Fleet Street and the Strand lay at the foot of the cliff, covered with water at high tide, and forming part of the

row and the site of Hainault Forest, and stretching into Hertfordshire and the heights beyond.

The only farm-land available for the city was thus a breadth of pasture-land between Oxford Street and the Strand, the rest of the environment being forest or marsh. This is the second important point to remember. Whatever might be in store for



Relics of Old London.

1. Roman Bath, Strand Lane. 2. Roman Wall, London Wall. 3. London Stone, Cannon Street. 4. St. Bartholomew's Church, Smithfield (Norman). 5. The Tower (Norman, etc.). 6. Old Houses in Holborn. 7. St. John's Gate, Clerkenwell. 8. The Monument. 9. Charterhouse Chapel (associated with Thackeray's *Newcomes*). 10. Old Curiosity Shop, Portugal Street (said to be the one which gives the title to Dickens's novel).

the future of London, one thing is quite certain—the city, even in its infancy, could never be maintained by any lands outside the walls, or by any adjoining land kept open for the purpose of cultivation. From the outset, when it was little more than a village, London was dependent for its supplies on the settlements and cultivated lands beyond what we now call the suburbs.

Three streams, not to speak of many small brooks, flowed into the Thames on the N. The first, starting from the W., was called the Fleet or the Holbourne. It rose in the northern heights, received the waters of many springs, drained a large expanse of country, and was navigable for a very short distance above its mouth. Through the middle of the site on which afterwards the city was built flowed the smaller stream, called the Walbrook. This rose in the northern moor as a tiny rivulet, was joined by other rivulets, and when it gained the Thames was a stream of some importance running through a valley about 130 feet broad, at the point where is now the Poultry, and becoming broader at the mouth. The Walbrook served for many centuries to divide the city into two—E. and W. London. Outside the walls, nearly three miles to the E., the swift and then important river Lea ran into the Thames, through a succession of marshlands which remain to this day. Although drained, they are below the level of high tide, and serve at least to make us understand the marshes of the Thames. Between the Fleet and the Walbrook, and again on the E. of the Walbrook, the northern cliff advanced to the edge of the river, which it overhung. It was a bank of stiff clay from twenty to thirty feet high, the foot of which, being continually washed by the river at every high tide, was gradually worn away.

The advance of the cliff at these points is the third point of cardinal importance concerned with the site of London. These, then, are the local conditions of the place: a tidal river almost 1,000 feet wide; marshes on either bank; a wild moorland on the N. useless for agriculture; an impenetrable forest on the N., and another on the S.; a comparatively small area in the W. available for pasture; protection against an enemy by river, marsh, and forest; dependence on supplies, save of fish, birds, and game, from the outside. Add to these an excellent natural port for small ships sailing up the river, at Dowgate, at the mouth of the Walbrook.

The next point to consider is the site with reference to the country.

When the Romans arrived, they found in the S. part of our island a civilization at least equal to that of Gaul, and, in fact, introduced from Gaul. How long the country had been opened up for trade, what was the extent of the trade, and when the immigration from Gaul began, it is impossible to determine. For reasons too long to be considered in this place, I am of opinion that many generations, perhaps many centuries, passed between the arrival of the Gauls and that of the Romans. The foreign trade, such as it was, great or small (I believe it to have been very considerable), was carried on through the southern ports, and especially through Dover and Southampton. The main artery of trade, the chief road—little more than a track—even in summer—ran through the middle of the island from N. to S., passing over the Thames at its first ford. This ford crossed a marsh, and an island or eyot in the marsh, before it reached the river. After the river the track crossed the marsh on the S. side by a causeway to the higher ground, and then struck S.E. in order to reach Dover, Richborough, and Sandwich, or S.W. to reach Southampton. The island was that afterwards called Thorney, a small oblong tract of land rising just above high-water mark, and situated at the mouth of a little stream which brought down in its course branches, trunks, and leaves, which were caught at the outflow, and so formed the island. Long, therefore, before London was founded, the trade of the country passed over Thorney.

The foundation of London has no connection at all with the arrival of the Romans. It is described by Aulus Plautius in the 1st century, and only a few years after the conquest, as a great commercial resort; it took the place of Thorney gradually, but long before the Romans came. The natural advantages of London over Thorney were the ports of the Walbrook and the Fleet, the existence of the high northern cliff running down to the river above the malarious and ague-stricken marsh, and the easy defence of the place by reason of its natural position. The site was also well watered, and capable of being converted, by quays built on piles, into a place of commerce far more extensive and more convenient than the small, low-lying, defenceless islet of Thorney.

In this way London was founded and gradually grew. Its name signified probably the 'ship-ford,' and is of Celtic, not of Roman or Saxon, origin. The old line of traffic which ran down the

Edgware Road, and so across the Park to the river, was diverted at the spot which is now the Marble Arch, and ran along the present Oxford Street and Holborn, crossing the Fleet R. by a ford and afterwards by a bridge, and so into the city. After the building of the city wall the traffic entered by a gate near but not on the site of Newgate. We must remember that at first there was no wall to protect London; there was no need of a wall. The quays and ports built by the early merchants were deserted in the winter; in the summer, and for two or three months only, there was a considerable concourse of those who bought and sold; the trade of London was carried on at an annual fair, so to speak, held every summer; there were no buildings; there was no town, as we understand a town; there was no attempt at walls, fortifications, or defence, because there was nothing to defend except at the time of the annual fair, when the traders themselves were perfectly able, without the help of walls, to defend their own wares against any attack that might be made upon them. No bridge then spanned the river; the only permanent residents were the fisher-folk, those who trapped the wild birds of the marsh and the game of the forest, and the slaves of the port.

That such was the condition of London when the Romans arrived seems tolerably certain. They selected the high spot on the E. side of the Walbrook for the site of a citadel and place of arms, and erected on this spot a fort, solid, strong, and impregnable, with access to the N. and the W. by gates, and to the S. by a bridge over the river. Foundations of the citadel have been discovered at various points. It reached from the Walbrook to Mincing Lane, and from Cornhill to Thames Street. The first bridge, according to my view, was built at the same time as the fortress, for which it afforded communication to the S., and was at the same time a means of offence and defence.

Roman London, then, consisted of the citadel first, with the bridge. There was no wall; and the trade of the place, which seemed to Tacitus so considerable, was in reality very small compared with its subsequent development. There was certainly a port beside the Bridge Gate—an artificial port cut out of the soft mud and shingle of the foreshore, supported and kept open by piles on which quays were constructed communicating with the Bridge Gate. This port was afterwards called Billingsgate or Lundenuneshythe. There was another and an earlier port formed

by the mouth of the Walbrook; there was a third, also artificial, though the date of its construction cannot be ascertained, on the site now called Queenhithe. It is also probable that Puddle Dock is a site of a fourth port; while, across the river, St. Saviour's Dock probably dates from Roman times. Here also was an ancient ferry across the river, much more frequented than the bridge, being easier of access and quicker. In these ports, and on quays constructed beside them to right and left, was carried on the export and import trade of the city.

The history of the city during the Roman occupation contains few events. In 61 A.D. the place was taken, and the defenceless people were massacred. Two hundred years later it was held by the usurpers Carausius and Allectus, the latter of whom was defeated and slain by the Roman general Aesclepiodotus in a battle fought close to London. When, in the 4th century, Roman roads made it possible for an invading army from the N. to march upon London, the wall was constructed. Its length proves the extent of the population of the city, because it was never the custom of the Romans to build more than they could defend. The area enclosed by the wall was 380 acres; the length of the wall, including the riverside part, was two miles and three-quarters. There is evidence that it was hastily built. There was no time to procure stone enough for the purpose from the quarries of Kent; the remaining portions and foundations have disclosed the fact that wherever stones existed in the city they were seized and built into the wall. Thus altars, millstones, funeral monuments, statues, columns on walls of villas, the walls of the citadel, the walls of every public building, including the forum, the imperial offices, the theatre, and the amphitheatre, were used in the construction of this huge wall, erected in the fear of invasion from the north. This was towards the end of the 4th century.

The retirement of the Romans and the coming of the Saxons followed. Nothing is then known of the city until the year 457 A.D., when we hear of the fugitives from the victorious Saxon invaders flying for safety across the bridge of London.

Early in the 7th century we hear of London again; it then belonged to the E. Saxons, and there was founded a Christian church under Mellitus as first bishop. Trade slowly revived, merchants began to return, and London in the 7th and 8th centuries became once more a great commercial centre.

Then the Danish invasions took place, and London, taken by the invaders and apparently pillaged, again lay desolate and deserted until it was recovered by Alfred. He repaired the defences, and made of London the strongest and, before long, the richest city in the island. The condition of the wall is shown by the fact that Alfred did not take the trouble to repair the old gates, but constructed new gates at Aldersgate, Newgate, Bishopsgate, and probably posterns at Ludgate and Cripplegate. So strong did he make London that the power of the Danes and Normans in repeated reigns could not take the city. So great was the trade in consequence of the confidence inspired by this strength that merchants flocked to London from Rouen, Caen, Germany, and the Low Countries.

The history of London itself is difficult to separate from the history of the country. Successive charters secured the liberties of the citizen. The sovereign might and did tax and assess the people heavily; but when from time to time the citizens presented a passive resistance to taxation, no monarch had the power to coerce them. As London grew more powerful, the demands of the sovereign grew greater; and the people of London became more exacting over the extension of their liberties, and more jealous of encroachment. This is the keynote for the historian. There existed among the people of London a traditional resolve—unwritten, but part and parcel of themselves—to maintain and to defend their liberties.

This side of the city history is best illustrated by a few notes on the growth of the municipality. On the resettlement of the city by Alfred, the whole of the area included within the wall was parcelled out into manors. Every manor was called after the name of its owner, who was its alderman, and exercised authority, holding courts, and being responsible for order on his own land. It is not certain how many wards or manors there were. There was no corporate government of the city. The king's officer was the port-reeve, whose functions were those of treasurer, guardian of customs and dues, and assessor of the same; he corresponded to the sheriff or shire-reeve of a county. The bishop exercised ecclesiastical jurisdiction, which then included a good deal of the temporal government. There was a folk-mote, or parliament of the people, called together on important occasions at Paul's Cross; and there was the ward-mote, whose powers and tenure of meeting seem to have depended at first

mainly on the aldermen of the wards. The export and import trade of the port was regulated by the merchants, subject to the king's dues; the retail trade was subject to the rules of the market, and the ordinances of the guilds, which existed from a very early period. The merchant guild, found in all mediæval cities, was probably regulated, perhaps in a nameless and informal manner, at the port itself.

The defence of the city was entrusted to a military organization called the knighten guild, whose duty it was to see that the citizens were duly armed for purposes of defence. This guild administered a tract of land outside Aldgate, called the Portsoken, and the Tower lands, whose revenues were devoted to the protection of the city. The guild consisted of the aldermen, notables, and some of the chief citizens. The time came when the defence of the city was practically taken over by the Normans, who had their fortresses in the east and the west; then, by permission of the king, the guild dissolved itself, surrendered its property, and gave it to the priory of the Holy Trinity at Aldgate, receiving in return for themselves, their ancestors, and their own kin, the 'fraternity' of the monastery.

As the guilds arrived at the possession of great power, they were regarded with jealousy by the Norman kings, especially by Henry II., who suppressed twenty of them as 'adulterine'—i.e. erected without royal licence. The chief cause of this jealousy was the establishment of the 'commune' in many of the continental cities, including Rouen, between which place and London there was an intimate connection. 'Never,' says the chronicler, 'would the king grant a commune to London.' Yet London, when the advantages of such a corporate body were understood, never ceased to plan the concession. This opportunity arose when Richard I. was in the Holy Land, when the government under Longchamp had become intolerable, and when the barons, headed by John, desired to enter and to take possession of the city, in order to depose Longchamp, which they could only effect by the permission of the citizens. They were admitted; on the same day John gave them the commune, and Longchamp was deposed. The first mayor was Henry Fitz Aylwyn, or Henry of London Stone, who was elected for life, and held the office for twenty-five years.

Within these limits it is not possible to trace the gradual growth of the municipality. The immediate effects of the first con-

cessions were of the most revolutionary kind. A city council was formed, at which the whole city was represented by the mayor, while the aldermen in their wards lost a great deal of their authority. The merchant guild, under whichever form or name it had existed, ceased to exercise authority in matters of trade; the

by side, became one incorporation under one government. Fortunately for the country—paradoxical as it sounds—it was never free from factions, which, while they weakened the city for a time, prevented its separation from the country or its domination over the country.

The mediæval population of

houses of business in Bruges corresponding to the firms of the Hansa merchants in London. The 'Men of the Empire' were represented by a colony from Cologne; there was a constant intercommunication between London and Normandy, especially Rouen; Bordeaux sent merchants to conduct the wine trade; the great galleys of Venice and of Genoa arrived every year in the port of London, and were received by Italian merchants; there was an extensive trade in English ships with the Levant; the Jewish money-lenders, after their expulsion, were succeeded by Lombards and 'Coursines,' licensed by the Pope to receive his taxes and to lend money under the form of gifts for which 'expenses' were charged instead of interest. The immigration of foreigners to London never ceased, and the early chronicles are full of names which denote their origin.

The influence of the church was also a very powerful factor in the government of the city. The bishop of London, even when he was personally unpopular, continued to stand for the city in ecclesiastical matters, and was regarded by the people as part of their own grandeur, and an illustration of their own wealth and strength. The dean and canons of St. Paul's owned a considerable portion of the city, and were patrons of many city churches. The monastic houses occupied large premises, and owned, in addition, whole streets; while there were now a hundred parish churches, each with its rector or vicar, its chantry priests, and its endowments of masses and various charities. The people employed in the service of the church—the architects, lawyers, notaries, scribes, illuminators, bailiffs, gardeners, butlers, brewers, bakers, carpenters; makers of vestments, paternosters, crucifixes, candlesticks, altar-cloths, painted windows, and the like—numbered many thousands, perhaps a fifth part of the whole population.

The monastic houses formed a chain within and without the city wall. Thus, without the wall, beginning at the E., were St. Katherine's by the Tower, St. Mary of Graces, the Sisters of St. Clare, Bethlehem, St. Mary Spital, Holywell, Charter House, St. Francis' Nunnery, the House of the Knights Hospitallers, St. Bartholomew's Priory and Hospital, White Friars, St. Mary of Roncesvalles, Westminster Abbey, and the Temple. Within the walls, following the same direction, were the Crutched Friars, the Holy Trinity, St. Augustine's, St. Helen's, Elsyng Spital, St. Francis' Hermitage,



City of London Corporation Liveries.

ordinances of the trade guilds were referred to the mayor; the port-reeve disappeared, and the power of the sheriffs, his successors, was greatly curtailed; the folk-mote, preserved in form, no longer had any power except for purposes of popular demonstration. The city, instead of a collection of manors lying side

London was as mixed as it is at present. The trade with the Baltic and with N. Europe was chiefly in the hands of the Hanseatic League, which enjoyed great and most valuable privileges. There was a large trade with Bruges, Ypres, and Ghent; many Flemings were settled in the country, and there were English

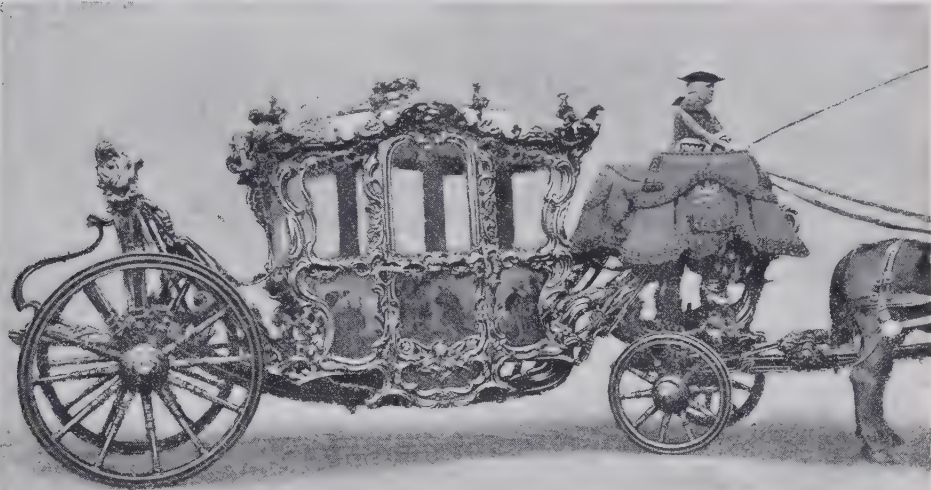
Gray Friars, Black Friars, and St. Martin's-le-Grand. On the s. side of the river were the foundations of St. Mary Overies and St. Thomas, and Bermondsey. The ecclesiastical foundations hindered the growth of London in most directions. The vast manor of Stepney, which belonged to the bishop of London, and extended N. so as to include Hoxton and Houndsditch, was kept free from any but farm-buildings. The moor was only built upon without Bishopsgate and Aldersgate. The lands of Westminster extended eastward as far as the Fleet R. The manors of Gray's Inn, St. Pancras, St. Giles, Bloomsbury, Islington, and St. Luke, as well as Old Street, belonged to the canons of St.

Then the great retail markets of West and East Chepe, with the Poultry, Newgate Street, Cornhill, Leadenhall Street, and Gracechurch Street. Lastly, occupying the N. part of the city, was the industrial quarter, in which everything was made. It is a rough division, not to be taken literally, but it will serve. The last part consisted of hamlets separated from one another by orchards and gardens, with narrow lanes leading to the markets, and one church to several hamlets.

The successive kings either tried to oppress or to conciliate the city. Its greatest enemy was Henry III. During his long reign trade decayed, and the city fell into a kind of anarchy, in which lawlessness and violence seemed

Tewkesbury; welcomed Henry VII.; stood by Queen Mary; joined the parliamentary cause against Charles I.; restored Charles II.; sent James II. on his travels. This is a most remarkable record of king-making and king-breaking, unequalled in the history of any other city.

We must not forget the trade of London. For many generations the chief export was wool. There was no export and import of food-stuffs, save on rare occasions; each village was sufficient to itself, or contributed to the wants of the neighbouring towns. The imports of the country consisted principally of luxuries, such as fine stuffs, silks, velvets, weapons, spices, wine, oil, and so forth; while the exports con-



The Lord Mayor's State Carriage.

(Photo by the London Stereoscopic Co., Ltd.)

Paul's. Most of Clerkenwell and Highbury belonged to the Knights Hospitallers; Canonbury to the canons of St. Bartholomew; Paddington, Westbourne, Kilburn, and Hampstead to Westminster Abbey; part of St. Marylebone to Hackney Abbey, with other manors and country places.

The belt of ecclesiastical manors was largely the cause of the crowded condition of the city. We find, for instance, that there were in the 12th or 13th century four belts of population. First the 'service,' including the people who lived by the riverside, in streets reclaimed as space was wanted from the foreshore on either side of the artificial ports. Then came the merchants' and the nobles' houses, lying between W. and E. Chepe and Thames Street.

to defy the authorities. Edward I. took the reins into his strong hands, and restored order after a ten years' suspension of the mayoralty; under the miserable rule of Edward II. lawlessness again broke out, to be repressed under his successor; and so on. It is noteworthy that in the history of the country London has been the chief instrument in the election and deposition of the king. The city upheld Edmund Ironside against Canute; accepted William I.; elected Henry I. in place of his elder brother; elected Stephen; joined the queen in the deposition of Edward II.; sent out its army for the arrest of Richard II.; elected Henry IV.; stood by his son, and supported his unfortunate grandson until the death of the Prince of Wales after

tinued to be wool, skins, iron and tin, and in the earliest times slaves. The great outburst of discovery and travel which characterized the 16th century laid the foundation for the expansion of trade, and therefore of empire, in the 17th and 18th centuries. This outburst is marked in the history of the city not only by the increased wealth of the merchants, but also by the creation of the trading companies, of which so many were founded by Elizabeth and her immediate successors.

Fire, plague, and famine from time to time attacked the city. It was in 1666 that the Great Fire occurred which destroyed fifteen city wards, with 13,000 houses. The fire, it is commonly stated and believed, cleared away a great

number of narrow courts and lanes. But their successors were nearly as narrow. Pestilence in some form or other was always present in the city. We hear of terrible visitations, such as that of the Black Death in the 14th century; but we forget that during the whole of the 16th and 17th centuries, down to the last visitation of 1665, the streets of London were never wholly free from plague. Perhaps the boon of a plentiful supply of water, conferred for the first time by the New River Company in 1620, may have done much towards averting more attacks of the disease.

Other events of importance—their importance must not be measured by the brief mention here allotted to them—were the reformation, on the whole welcomed by the people; the dissolution of the religious houses; the Marian persecutions, which consolidated the reformation; the rebuilding of the city after the fire; the foundation of the Royal Exchange, and its subsequent rebuilding after the fire of 1666 and of 1841; the closing of the Exchequer by Charles II., which effectually alienated the merchant class from the Stuarts; the establishment of the Bank of England in 1694; the removal of the city gates in 1760; the piecemeal destruction of the city wall; the filling up of the town ditch; the rebuilding of London Bridge; the building of the many bridges which now span the river; the abolition of imprisonment for debt—an event of the highest importance in a trading city; the decrease of the population of the city proper until it now numbers only a few thousands; the occupation of the suburbs, which are now covered with houses; the enormous increase of the population reckoned over this newly-built area; the creating of the London County Council and the metropolitan boroughs.

GOVERNMENT.—For the purposes of the imperial and judicial side of local government the County of London and the City of London are almost entirely distinct, while for the purposes of the administrative side of local government they are to a considerable extent united, forming together the Administrative County of London. The purposes for which local government exists on its imperial and judicial side are: (1) the preservation of the King's peace; (2) the administration of justice in local courts, both civil and criminal; (3) the enforcement of civil process; (4) the militia; (5) the representation of the people in Parliament; and (6) the police. The organization for these purposes in counties

generally consists of the sheriff, the lord-lieutenant, the magistrates, the clerk of the peace, the coroners, the county courts, and the standing joint committee of the County Council and the justices. All these authorities exist in London, but in some cases their jurisdiction is superseded by that of other authorities peculiar to London.

The Sheriff.—There are two sheriffs of the City of London, elected annually on Midsummer Day in the Court of Common Hall by those freemen of the city who are liverymen of the city companies. The sheriff of the County of London is appointed in the same way as in other counties. (See *SHERIFF*.) The sheriffs of the city attend the sittings of the Central Criminal Court, attend the Lord Mayor on official occasions, and share the expense of his entertainments, present the city's petitions to Parliament and addresses to the King. The sheriff of the County of London has scarcely any duties. There are no judges on circuit to be attended, as the county is within the Central Criminal Court District; and there are no county elections, at which the sheriff is the returning officer, because the whole county is within the metropolitan parliamentary boroughs. The other duties of the sheriff are all performed by the under-sheriff or the deputy-sheriff.

The Lord-Lieutenant.—The lord-lieutenant of the County of London has the same duties as in other counties. (See *LORD-LIEUTENANTS*.) In the City of London the lieutenancy is in commission—i.e. there is no lord-lieutenant, but a large number of commissioners who together exercise the office.

The Magistrates.—(1.) In the County of London the magistrates are the justices named in the Commission of the Peace for the county. They have all the civil jurisdiction of justices in other counties, both at special and quarter sessions; but their criminal jurisdiction is exercised by the metropolitan police magistrates and the paid chairman and deputy-chairman of the courts of quarter sessions. (2.) Justices of Middlesex, Surrey, Kent, the City of Westminster, and the Tower, at the time when London was made a county, are justices of the new County of London as long as they reside or occupy property within it. (3.) The chairman of the London County Council and the chairmen of the London Borough Councils are justices of the County of London during their term of office. (4.) The commissioner and assistant-commissioners of the metropoli-

tan police. (5.) The metropolitan police magistrates. (See *METROPOLITAN POLICE COURTS*.) (6.) The chairman and deputy-chairmen of the court of quarter sessions of the County of London. By section 42 of the Local Government Act, 1888, the King has power, on the petition of the County Council, to appoint a barrister of not less than ten years' standing to be chairman, or a deputy-chairman, of the court of quarter sessions of the County of London, and any such chairman or deputy-chairman has power to hold the court alone. Courts of quarter sessions are held by these paid magistrates at Newington and Clerkenwell, and the result is that the criminal jurisdiction at quarter sessions of the ordinary justices of London is ousted.

In the City of London the magistrates are the Lord Mayor, aldermen, and the recorder, who are all justices by charter. There is a court of quarter sessions for the City of London, but most criminal cases arising in the city are tried at the Old Bailey, where the recorder and the common serjeant of the city sit as judges of the Central Criminal Court. The Lord Mayor or an alderman, sitting at the Mansion House or Guildhall justice room, has the powers of two justices sitting as a court of petty sessions, and, in addition, nearly all the special powers of a metropolitan police magistrate.

The clerk of the peace is the clerk of the court of quarter sessions. He has the custody of all records and documents belonging to the court of quarter sessions and the justices out of session. In most counties he is also the clerk of the County Council, but he is not so in London.

The coroners in London have the same duties as elsewhere (see *CORONER*); but the coroner of the City of London also holds inquests in cases of fires in the city, under the City of London Fire Inquests Act, 1881.

The modern county courts have little connection with the county. They are imperial courts of inferior jurisdiction, situated all over the country for the sake of convenience and cheapness.

The Central Criminal Court is a court of the High Court of Justice, adapted to meet the needs of London and the surrounding district. (See *CENTRAL CRIMINAL COURT*.)

The metropolitan police and the city police are dealt with under *POLICE*. The standing joint committee of the County Council and the justices has the same duties in London as in other counties, but it has nothing to do with the police.

Before the passing of the Metropolis Local Management Act, 1855, administrative local government in London was in a state of confusion. For many purposes there was no central authority at all, and the district authorities were numerous and diverse, with limited and conflicting powers. For two purposes the corporation of the City of London was a central authority. In 1327, by charter of 1 Edward III., the corporation was granted the exclusive right of erecting markets in the city, and within seven miles of St. Paul's. These rights continue in force till the present day. Many markets have been removed or rebuilt, and all changes in recent times have been made under special acts giving borrowing powers and other facilities which required the assent of Parliament. In former times the city markets were farmed, but since 1771 the corporation has kept them in its own hands. The existing city markets are (1) the London Central Markets in Farringdon Street; (2) Smithfield Hay Market; (3) the Metropolitan Cattle Market at Islington; (4) Leadenhall Market; (5) Billingsgate Fish Market; and (6) the Deptford Foreign Cattle Market. (See LONDON—MARKETS.) There is also the Coal Market, which, however, is not, properly speaking, a market, but a coal exchange. There are several private markets in London not belonging to the city, such as Covent Garden and Spitalfields Markets; but as the crown cannot derogate from its own grant, the corporation must be assumed to have assented to the charters establishing them.

The other matter with regard to which the corporation exercised powers extending far beyond the limits of the city was the conservancy of the Thames. By a charter of 3 James I., the corporation was granted the conservancy of the Thames from Staines in Middlesex to Yanleet Creek in Kent. Disputes arose as to the rights of the crown and the corporation in the bed and soil of the river, and a compromise was made under which in 1857 the corporation's rights were transferred to the Thames Conservancy Board. Other authorities which exercised jurisdiction over the whole or most of London before 1855 were the Metropolitan Commissioners of Sewers, the officials under the Metropolitan Building Act, 1844, and the justices. Practically the only district authorities before 1855 were the vestries of the parishes and certain Boards of Improvement Commissioners appointed under private acts.

In 1855 the Metropolitan Board of Works and the Metropolitan

Vestries and District Boards were created by the Metropolis Management Act of that year. The area chosen for the metropolis as defined by that act was practically the area of the present administrative County of London, though the boundaries have been slightly altered under recent acts. It is unnecessary to speak of the constitution of the board, or of the vestries and district boards, as they have all been abolished.

All the powers and duties of the Metropolitan Board of Works were transferred to the London County Council in 1888. The vestries and district boards under the Act of 1855 were the local sanitary authorities outside the city, and although their constitution was altered by the Local Government Act, 1894, they continued to exist till the creation of the metropolitan boroughs by the London Government Act, 1899.

The Local Government Act, 1888, made a great change in the government of London. It created the new County of London, and provided it with an organization for non-administrative purposes which has already been referred to. It also created the administrative County of London out of the County and the City of London, and directed that a county council should be elected for that area. The London County Council consists of 118 councillors, 19 aldermen, and a chairman, who may or may not be a councillor or an alderman. There may also be a vice-chairman and a deputy-chairman. The councillors are elected for three years, the aldermen are elected by the councillors for six years, and the chairman, vice-chairman, and deputy-chairman are elected annually by the councillors and aldermen, but outgoing aldermen may not vote. Women are not eligible as county councillors.

In addition to all the property, powers, and duties of the Metropolitan Board of Works, the London County Council also obtained all additional powers and duties conferred upon county councils generally by the Local Government Act, 1888. Since that date further powers have been conferred upon it by a large number of acts, both local and general. The direct administrative work of the County Council as a central authority for London includes the following important matters: the construction and maintenance of the main drainage system of London; the maintenance of ten bridges over the Thames, between twenty and thirty other bridges, the Woolwich ferry, and the Blackwall tunnel; the maintenance of the Thames embankments; the mak-

ing of large metropolitan improvements, and contributing to the cost of local improvements; the management of existing parks and open spaces, and the purchase of new ones; the management of the Metropolitan Fire Brigade, and of the county lunatic asylums, reformatory and industrial schools; the clearing of insanitary areas; the building of houses for the working classes, and the erection and management of common lodging-houses; the appointment of coroners, and the provision of places for holding inquests; the purchase, leasing, and working of tramways; a service of passenger steamers on the Thames; the administration of the Contagious Diseases of Animals Acts; the provision of small holdings; the management of lands and houses belonging to the council, of the estimated value of between two and three millions; and the execution of a considerable part of the council's own works by means of its works department.

The council also exercises large powers of supervision over the work of the local sanitary authorities, and can take action itself when they are in default. It licenses theatres outside the Lord Chamberlain's district; all music halls in London; race-courses within ten miles of Charing Cross; slaughter-houses, cow-houses, and places for carrying on offensive businesses; all factories, magazines, and stores for making or keeping explosives and petroleum; and houses for the reception of children under the Infant Life Protection Acts. It examines and approves plans, and makes by-laws under the London Building Act. It appoints inspectors of dairies and cow-sheds, inspectors of weights and measures, and for the purposes of the Sale of Coal Act, Shop Hours Act, and Factory and Workshops Acts. It appoints gas examiners, and tests gas and electric meters; and exercises duties with regard to the prevention of floods and the pollution of rivers. It makes by-laws for a number of purposes, and has powers to promote and oppose bills in Parliament affecting London. Its current expenditure is provided for by the county rate, assisted by the Exchequer contribution; and its capital expenditure is met by the creation of London County Council stock and bills. All new borrowing must be sanctioned by Parliament, and the council introduces an annual money bill, which includes all the capital proposed to be borrowed, both for the purposes of the council and of the other local authorities in London, who must all borrow through the council. By the

Education (London) Act, 1903, the Education Act, 1902, is applied to London. The London School Board is abolished, and the County Council is made the education authority for London, and appoints the Education Committee.

The local or district administrative authorities in London are the councils of the twenty-eight metropolitan boroughs created by the London Government Act, 1899, and the Corporation of the City of London. The metropolitan boroughs are not boroughs within the meaning of the Municipal Corporations Acts. Each metropolitan borough has a council consisting of a mayor, aldermen, and councillors; but the council is really only a district authority created because of the enormous size of London, to exercise those subordinate powers and duties which can best be administered locally, while the real central authority is the County Council. The borough councils are the local sanitary authorities, and exercise nearly all the powers of the London Public Health Act; all powers with regard to the construction and maintenance of sewers and drains, except main drains; and the making, maintaining, lighting, watering, cleansing, and regulating of the streets. They provide and manage baths and wash-houses, public libraries, and minor open spaces. They have the powers formerly exercised by Burial Boards under the Metropolitan Burial Acts, and are the local authorities under the Electric Lighting Acts, the Allotment Acts, and for some purposes of the London Building Act. They are the overseers of the poor within their boroughs; and they collect the whole of the rates of London, not only for their own expenses, but for all the other spending authorities in London.

In addition to the powers possessed by the borough councils, the corporation of the city exercises some powers within the city which elsewhere in London are in the hands of the County Council, such as the management of lunatic asylums and reformatory and industrial schools, and the powers as to petroleum, explosives, and weights and measures. They also possess and manage four bridges over the Thames—Blackfriars Bridge, Southwark Bridge, London Bridge, and the Tower Bridge, which are all maintained out of the revenues arising from the Bridge House Estates. The city markets have already been referred to; and the corporation have also provided, out of the proceeds of an old duty on grain, certain open spaces outside the County of London,

but within twenty-five miles of it, the principal of which are Epping Forest and Buraham Beeches. The poor in London are provided for, as in the rest of the country, in parishes and unions, under boards of guardians; but since 1864, and more fully since 1867, some special provisions have been made with regard to London as a whole. Certain expenses have been treated as common expenses, and paid for out of the Common Poor Fund, raised by a uniform rate over the whole of London; and certain services, such as the provision of hospitals for fever, smallpox, and diphtheria patients, have been transferred to a central authority, called the Metropolitan Asylums Board. (See ASYLUMS BOARDS.)

The water supply of London has been in private hands until quite recently. (See METROPOLITAN WATER BOARD.)

MARKETS.—There are nine principal markets in London. Three of these—*viz.* Billingsgate, the London Central Markets, and Leadenhall Market—are within the city, and belong to the corporation, who, under a 'charter in Parliament' granted by Edward III. on March 6, 1326, are the market authority for London. The other six—*viz.* the Metropolitan Cattle Market, the Foreign Cattle Market (which, with a smaller fish market at Shadwell, are also under the control of the corporation), Spitalfields, Covent Garden, Stratford, and the Borough Markets—are in the County of London. *Spitalfields Market* was established under a charter granted by Charles II., dated July 29, 1682, and the rights in it are at present leased to Mr. Robert Horner for a term of years at an annual rent of £5,000. Under the provisions of an Act of 1902, however, the corporation has acquired the site of the market, at a cost of £176,750, and is now negotiating for the purchase of Mr. Horner's rights and interests in the undertaking. *The Stratford Market* was established in 1879, under an Act of Parliament, by the Great-Eastern Railway Company for the sale of the produce carried to London over their system. *The Borough Market*, for fruit and vegetables, is also a parliamentary market. It is carried on by trustees, who apply the profits to the reduction of the poor-rate of the parish of St. Saviour, in which it is situated. *Billingsgate* is the most ancient market in London. It is mentioned in a proclamation dated 1297, and it was given in evidence before the Royal Commission of 1893 that it was used for the sale of fish a thousand years ago. The first Act of Par-

liament relating to the market was passed in 1699, by which it was made a 'free and open market for all sorts of fish whatsoever.' The total sum expended by the corporation since 1849 in the enlargement of the market has been £318,981. The supplies of fish to Billingsgate arrive both by land and water, and in 1904 these amounted to 113,388 tons by land and 61,218 tons by water. *Smithfield* was an existing market in 1253, and from 1614 to 1855 was utilized for the sale of live stock. In the last-named year it was removed to its present site at Islington, and became known as the *Metropolitan Cattle Market*. The new market occupies a site of about 75 acres, and cost £504,842. It finds employment for 1,600 persons, and in the market area two blocks of model dwellings, accommodating 124 families, have been erected. The number of cattle consigned to the market in 1904 was 606,179, and the receipts from all sources in the same year amounted to £19,511. A scheme is at present under the consideration of the corporation for reducing the area of the market, and for abolishing the private slaughter-houses there and substituting public abattoirs. *The Foreign Cattle Market* at Deptford was opened in January 1872, 'for the landing, reception, sale, and slaughter of foreign animals,' with a view to the prevention of the introduction into Great Britain of contagious diseases, and was enlarged in 1881. A sum of £379,500 was expended by the corporation in acquiring the site of 30 acres and in constructing the market, which includes twelve lairages, capable of accommodating 5,000 cattle and 22,000 sheep; 66 slaughter-houses and chill rooms with a holding capacity of nearly 1,000 sides of beef. The number of animals landed at the market during 1904 was 240,534. *The London Central Markets* stand partly on the site of old Smithfield Market, and were opened in December 1868. They comprise a meat market, a poultry and provision market, and a general market with poultry and provision, inland fish and fruit, vegetable and flower sections. The last-named section took the place of Farringdon Market, which had become inconvenient and incommodious, and was discontinued in June 1892. The meat market, which affords direct and indirect employment to 9,000 persons, and the erection of which involved a capital expenditure of £1,075,000, is believed to be the largest dead-meat market in the world. It is strictly wholesale except on Saturday afternoons, when the 'People's Market' is held. The

METROPOLITAN

- BOROUGHS.**
1. Hampstead.
 2. St. Pancras.
 3. Islington.
 4. Stoke Newington.
 5. Hackney.
 6. Poplar.
 7. Bethnal Green.
 8. Stepney.
 9. Shoreditch.
 10. Finsbury.
 11. City of London.
 12. Highbury.
 13. Highborn.
 14. Westminster.
 15. Marylebone.
 16. Paddington.
 17. Kensington.
 18. Hammersmith.
 19. Fulham.
 20. Chelsea.
 21. Wandsworth.
 22. Battersea.
 23. Lambeth.
 24. Southwark.
 25. Camberwell.
 26. Bermondsey.
 27. Deptford.
 28. Lewisham.
 29. Greenwich.
 30. Woolwich.





London Palaces and Official Residences.

1. Lambeth Palace (Archbishop of Canterbury). 2. Fulham Palace (Bishop of London). 3. No. 10 Downing Street (official residence of the Premier). 4. Westminster Palace (Houses of Parliament). (Photo by H. N. King.) 5. Buckingham Palace. 6. St. James's Palace. 7. Marlborough House (Photo by H. N. King.) 8. Kensington Palace.

poorer classes from all parts of London attend by thousands on these afternoons, when a large retail business is transacted. The total expenditure on the Central Poultry and Provision Market amounts to £332,000, and on the various sections of the general market to £533,000. The official returns show that during 1904 the total weight of fish, meat, poultry, provisions, and general produce delivered at the Central Markets was 418,199 tons, of which 153,844 tons came from America, 85,588 tons from Australia and New Zealand, and 65,243 from 'general foreign' sources. The toll on this quantity was £46,904, while the receipts from all sources in 1903 were £136,757. *Leadenhall Market* has existed from very early times, and was an ancient prescriptive market for the sale of meat, poultry, game, and provisions. An Act of 1879 abolished the then existing market, and empowered the corporation to improve the site, lay out and form new streets, and construct a new market for the sale of 'meat, fish, and poultry and other provisions.' This new market, with its approaches and avenues, cost £247,800, and was opened in December 1881. No record is kept of the supplies to this market. The corporation have spent upon their markets, from time to time, a sum of not less than £3,500,000. *Covent Garden Market* is held by the Duke of Bedford under a charter granted by Charles II. to the then Earl of Bedford, and under a regulating Act of 1828. It has long ceased to be the 'filthy and noisy market held close to the dwellings of the great' described by Macaulay. The present owner has, at the cost of many thousands of pounds, improved and extended the market, and has provided lofty and commodious buildings in which what is probably the largest wholesale business in fruit, both home-grown and foreign, vegetables and flowers, in the world is carried on daily. As the market is private property, no statistics as to the annual volume of its trade are published, but it is understood that the net receipts average nearly £10,000 a year. A word or two should be said about *Columbia Market*, one of the most elaborate pieces of Gothic art in the metropolis. This was the gift of the Baroness Burdett-Coutts to the Bethnal Green district, and was opened in 1869. It is believed to have cost £250,000, and was intended to place within the reach of the dense population around it supplies of provisions, and especially of fish, of better quality and at more reasonable prices than they

could be procured at through the small dealers and hucksters who had previously monopolized the trade. But the grand conception, splendidly undertaken and munificently carried out, has been a disastrous financial failure; and though one part of the building is still in use as a vegetable, hay, and straw market, the great market-hall and its chief adjuncts are practically perishing for lack of use.

TRAFFIC.—The problem of London traffic presents two broad aspects. The one is concerned with facilities for getting from the outside to the inside of the metropolis, and *vice versa*; and the other with progression in the main thoroughfares of the central districts. A third question which is involved in the general problem is the constitution of a tribunal or authority, similar, it may be, to the Rapid Transit Commission of New York, which shall be especially charged with the co-ordination, the control, and the regulation of the whole of the traffic projects in and for London. The solution of these questions has been submitted to a royal commission. The state of things existing but three or four years ago had become intolerable. The means of what has now come to be spoken of as 'intra-mural transportation' were hopelessly inadequate for the necessities of the population under the present conditions of London life and labour. Parliament was therefore appealed to, and on Feb. 10, 1903, a royal commission was appointed to inquire into the whole subject of London traffic. The reference was framed in the widest possible terms. It directed the commissioners to inquire into the means of locomotion and transport in London, and to report (1) as to the measures which they deem most effectual for the improvement of the same, by the development and interconnection of railways and tramways on or below the surface, by increasing the facilities for other forms of mechanical locomotion, by better provision for the organization and regulation of vehicular and pedestrian traffic, or otherwise; and (2) as to the desirability of establishing some authority or tribunal to which all railway or tramway construction of a local character should be referred, and the powers which it would be advisable to confer upon such a body. The commissioners issued their report on July 20, 1905, the main conclusions of which are briefly stated here. The population must be taken out of London in many directions at rapid speed, frequent intervals, and cheap rates, as to rehouse them 'on site' is

far too costly. The commissioners therefore recommend the construction of two main avenues through London, each 140 ft. wide—one, from east to west, to connect Bayswater Road with Whitechapel; and the other, from north to south, to connect Holloway with the Elephant and Castle. These avenues are to have four lines of tramways on the surface, and four lines of railway beneath, both to be worked by electricity, so that express trains and local stopping trains may be run on different rails. The total cost is estimated at 24 millions sterling. The widening of several other streets, a viaduct at Blackfriars Bridge, and a bridge across the Strand are among the other recommendations. The commissioners advise a great extension of tramways in London and in the suburbs; through connection between the different tramway systems; that provision be made for running outside as well as inside the county, and that the power of veto presently exercised by local authorities be abolished. The commissioners recommend the establishment of a traffic board, which should keep in touch with all the local authorities in Greater London, and maintain a friendly attitude towards them and towards all companies working railways, tramways, or other means for facilitating locomotion and transport. The Balfour administration, prior to its resignation (1905), announced a bill with this object.

A few figures will serve to illustrate the nature of the problem. Every day in the week, except Sunday, there enter the central districts, by railway, tramway, and omnibus, before half-past ten in the morning, something like half a million of people from north and south of the Thames. For all these people, of course, cheap and rapid locomotion is an absolute necessity. It is estimated that 15,000 tram cars run daily in London, most of them having their termini just on the boundary of the central area. The number of passengers carried in the London County Council cars alone amount to about 200,000,000 annually. The London roads are traversed, it is impossible to say how many times daily, by 4,000 omnibuses, and they convey annually, it is stated, 500,000,000 persons. There are, in addition, between 7,500 and 8,000 hansom cabs, and about 4,000 'four-wheelers,' which are more or less constantly plying for hire in the streets of the metropolis. When to these figures there are added the almost countless carts, vans, drays, lorries, and trolleys which use the streets,

some idea may be gathered of the daily volume of vehicular traffic within the metropolitan area. At the Bank, for instance, nearly 800 vehicles pass each hour of the day. Through Oxford Street there is an hourly traffic of 550 vehicles. Some 500 vehicles per hour pass the junction of Oxford Street and Tottenham Court Road, while a still greater traffic goes along what is called the Piccadilly and Charing Cross route from Hammersmith to the city. And all this traffic has grown up while, with a few notable exceptions, the streets of London have remained as narrow and as irregular as they were a hundred years ago.

Take another phase of the problem, which is concerned more perhaps with pedestrian than with vehicular traffic. Sixty years ago the number of railway stations in London was eight. These were Euston, Paddington, Addison Road, Nine Elms, Bricklayers' Arms, London Bridge, Shoreditch, and Fenchurch Street. To-day, it is estimated, there are nearly 300. Within the area of what is known as Greater London there are 530 railway stations, and this number will be increased to upwards of 600 when the underground or 'tube' railways which are in course of construction are opened in the next year or two. The length of the trunk lines, local lines, local joint lines, and tubular lines, including those now building, in Greater London exceeds 630 miles. There are within the metropolitan area 22 stations which may be regarded as termini, and into these there pour daily no fewer than 4,697 trains, of which 4,252 represent suburban traffic. The underground and surface railways operating in London, acting as distributors and feeders of the trunk lines, carry not less than 600,000,000 passengers per annum, and it has been asserted that the new accommodation being provided will afford greater facilities, to an extent ranging from 400,000,000 to 450,000,000 additional passengers a year. It will thus be seen that the problem, in whichever aspect it is regarded, is one of enormous proportions, intricacy, and complexity.

The main difficulty, or at least one of the main difficulties, in so far as 'intra-mural transportation' is concerned, is the getting of the passengers who arrive in the suburban trains at the scattered termini to their work in the central area. It is expected that this difficulty will be largely removed when the new 'tube' railways are opened. The enterprise, which is being developed under the control of Mr. Charles T. Yerkes, who built and successfully 'oper-

ated' the electric tramways in Philadelphia and Chicago, is one of great magnitude. It involves the construction of three new lines of tube railways (Baker Street and Waterloo; Great Northern, Piccadilly, and Brompton; and Charing Cross, Euston, and Hampstead); the electrification of the existing District (Underground) Railway; the provision of a new line of electric surface railway between Edgware and Hampstead; and the working, in conjunction with a portion of the scheme, of the London United Tramways (1901) Co., Ltd. The Baker Street and Waterloo railway will probably be opened early in 1906. It is 5 m. long, and has two running tunnels of a diameter of 11 ft. 6 in. Both tunnels are 'through' between Baker Street and Waterloo; and those on the extensions which have been recently sanctioned to Bishop's Road at the one end, and the Elephant and Castle at the other, are nearing completion. The Great Northern, Piccadilly, and Brompton line, which has a length of 10 m. and tunnels of 11 ft. 8½ in. diameter, will run from Finsbury Park to Earl's Court, and, by a branch line, from Holborn to the Strand. The northern and eastern sections of the railway will form a link between the Great Northern and Midland termini at King's Cross and St. Pancras and the west of London, and the western section will provide a route from the far west of London to Brompton, Knightsbridge, Hyde Park, and Piccadilly. At Piccadilly Circus it will make connection with the Baker Street and Waterloo railway, and at Cranbourne Street with the Charing Cross, Euston, and Hampstead railway. The greater part of the 'tube'—over 80 per cent.—has been driven, and the line will probably be opened early in 1906. The Charing Cross, Euston, and Hampstead railway, with its northern overground extension from Edgware to Hampstead, will give communication between Edgware, Hendon, Hampstead, Highgate, Kentish Town, and Camden Town and the city. At Euston it will be able to exchange traffic with the City and S. London; at Oxford Street it will connect with the Central London railway, and at Cranbourne Street with the Great Northern, Piccadilly, and Brompton railway. The total length of the line is slightly over 8 m. The Edgware and Hampstead surface light railway, over which the trains of the Charing Cross, Euston, and Hampstead railway will travel to Edgware, is about 6 m. long. The power for working the three underground lines will be supplied from the District

Railway Company's generating station in Chelsea. The total cost of these various undertakings is estimated at not less than £15,000,000, and it is understood that the whole scheme will be in operation in 1906. London will then be in possession of the largest and most comprehensive system of underground and tube railways in the world. The underground as distinguished from the tube railways are the Metropolitan and the District, which are (1906) in process of electrification. The first tube railway was the City and South London, which now runs from Clapham Common, on the south, to the Angel, on the north of the river, with an extension to King's Cross and Euston authorized. This was opened in November 1890. The length is just over 6 m., and the capital of the company £2,598,000. The second was the Waterloo and City line, with a capital of £720,000—a small tube running from under the main terminus of the London and South-Western railway at Waterloo to the Bank. The Central London, or the 'Two-penny Tube,' as it is popularly called, was the third. This, with a length of 6 m. 5 fur., has a capital of £4,200,000, and runs from Shepherd's Bush to the Bank, with many intermediate stations. The fourth and last tube railway at present working is the Great Northern and City, which was opened in February 1904. It has a length of 3½ m., from Finsbury Park to Moorgate Street, and an authorized extension of a quarter of a mile to Lothbury (City). The capital of the company is £3,113,000. Thus the amount of capital invested in tube railways now in operation is £10,631,000. A sum of between £15,000,000 and £16,000,000 is represented by those in course of construction, and of nearly £4,000,000 by those authorized but not yet begun, or an aggregate capital of nearly £30,000,000.

Another enterprise which is working towards the solution of some of the present difficulties is the extension of the electric tram-car service. There are approximately in the County of London 116 miles of tramways open for traffic. Over a third of this distance the service is worked by the County Council: 48 miles odd are leased by the council, and about 28 miles are owned by tramway companies. This gives one mile of single tramway for every 22,500 of the population, as compared with one mile for 3,942 persons in Manchester, one for 5,244 in Glasgow, and one for 6,781 in Liverpool. In the case of New York there is one mile of tramway for every 2,500 or 3,000

people; and in all these cities the lines are electrically worked, whereas in London only one-quarter of its tramways has been electrified. The exact length of electric tramways in the county in 1904 was 27 route miles, equivalent to 54 miles of single line. These are all on the south side of the river, and are worked by the County Council on the conduit system. The cost of construction is about £28,000 per mile of street, double line; but though this is something like 33 per cent. greater than the cost of the overhead system, it is claimed that the durability of the conduit system is very much greater. The total cost in connection with the track work alone of the lines so far converted to electric traction amounts to, roughly, £743,000. The number of electric cars now in use is about 300. They are of two types—the double-deck bogie car, carrying 66 passengers; and the double-deck single truck car, carrying 56 passengers. The service from the termini is a 2½-minutes one, though on certain lengths of route it becomes practically little more than a one-minute service. It is intended to proceed with the conversion of the horse tramways as the various sections within the county are acquired by the County Council. A great scheme of electrification is in progress on the north side of the river, and extending beyond the county boundary into Middlesex and Hertfordshire. The area of the entire enterprise extends from Willesden in the west to Walthamstow and Woodford in the east. The London county boundary practically forms the southern frontier, and towards the north the system will be carried as far as Watford on one side and Cheshunt on the other. At present there is no connection at any point between the northern and southern services. But the County Council have obtained powers to construct tramways across Putney Bridge and Vauxhall Bridge, for the purpose of linking up the two services at these places; and they are now carrying to completion the building of a shallow subway, through which trams will be run, for the purpose of forming a connection north and south, from Holborn to the Strand, and thence, under the Strand and Wellington Street, to the Thames Embankment. Powers were sought in 1903, and again in 1905, to continue the lines for the subway along the Embankment, and then, on the surface, to run a tramway over Westminster Bridge, to connect with the southern tramway terminus in Westminster Bridge Road. This would have given a through route

practically from the northern to the southern boundary of the county. But Parliament refused to sanction this portion of the scheme, and it remains in abeyance for the present. The shallow tramway from Holborn to the Embankment is being constructed a few feet beneath the surface. The route is three-quarters of a mile in length, and for two-thirds of the distance it comprises a 'cut and cover' tunnel measuring 20 ft. in width and 14 ft. in height. In passing under the Strand and Holborn, the tramway, which is to be worked on the conduit system, is in twin tubes, and access to intermediate stations will be gained from the street refuges. The cost of this important work—an enterprise that in a smaller city would have attracted world-wide attention—is placed at £300,000. The advantages claimed for shallow tramways are that the equipment and working expenses are considerably less, and that the tunnels would include subways for pipes, mains, cables, wires, etc., which would avoid the frequent and irritating interruption of traffic caused by the breaking up of the streets for the laying and repairing of pipes.

In June 1905 the County Council inaugurated, at an expenditure of nearly £300,000, a municipal service of passenger steamboats on the Thames—a great highway which, for this purpose, has been lying derelict for several years. The service, whatever else it does, affords new facilities for connection between the north and south sides of the river. The service was fully appreciated by the public during the finer months of the year, but proved less successful in winter. The council is also agitating for a new bridge across the Thames between Waterloo and Blackfriars Bridges; and it is carrying out, at a cost of millions of money, immense street improvements in the straightening and widening of thoroughfares such as the Strand and Fleet Street and Piccadilly, and the construction of new broad arteries for the purpose of giving additional accommodation for the street traffic. The opening (October 1905) of the thoroughfares of Kingsway and Aldwych completed the principal part of the great Holborn and Strand improvement scheme. The omnibus companies, though somewhat belatedly, are beginning to take a share in the provision of more rapid means of transit. Motor omnibuses are being gradually placed upon the streets in various directions. The London Limited Electric Tramways Company, who bring millions of passengers annually to

the county boundary, are continually extending their undertaking on the western side of the metropolis. Several of the railway companies which have to deal with a vast suburban traffic have electrified, or are in process of electrifying, the lines on which it is carried; while other companies, with a perfect tangle of lines and several hundreds of stations within the limits of the county, have the question of electrification under consideration. The only direction in which nothing is being done in the way of improvement is in the regulation of the street traffic. An infinite variety of suggestions has been made towards this end. The separation of the fast from the slow traffic; the diversion of heavy traffic; the adoption of alternative routes; the fixing of 'point' stations or stopping-places for omnibuses; the construction of suspended railways; double-deck streets; great avenues running to all points of the compass; circular roads around the whole metropolitan area; the building of subways for passengers at all points where streams of vehicles converge, so that they may cross the thoroughfares without the necessity of 'holding up' the traffic; and of subways under the footpaths for pipes, etc., so as to reduce to a minimum the most fruitful cause of obstruction, the opening of the streets—these are among the proposals which have been advanced for consideration.

LONDON PORT is still, as it has been for at least two centuries, the greatest port in the world in respect of the amount of shipping and of goods which enters it. The total shipping entering it is, roughly speaking, one-fifth of the total shipping of the United Kingdom; while the value of the commodities imported at the port is, approximately, one-third, and of the exports about one-fourth, of the total value of the imports and exports of the whole of the country. The number of sailing and steam vessels engaged in the foreign trade and coastwise which entered the port with cargoes and in ballast in 1903 was 27,359, representing a net register tonnage of 17,075,313, while 27,769, with a tonnage of 16,407,708, cleared the port. The figures for 1904 represent a slight falling off in traffic. A total of 27,098 vessels, with a tonnage of 17,073,852, entered the port in 1904, and 27,471 vessels, with a tonnage of 16,251,474, cleared it. The complaint made, both by shipowners and by traders, is that, though the conditions of modern commerce have been revolutionized, nothing has been done to adapt the port to the new necessities, and that the trade is, as

a consequence, going to those ports where greater facilities for the accommodation of vessels and for the rapid loading and unloading of cargoes are offered. It is urged that, while continental ports such as Hamburg, Antwerp, and Rotterdam, and home ports such as Liverpool, Glasgow, Bristol, and Southampton, are making great improvements and developments to meet the changed conditions brought about by, among other things, the increased size and draught of ocean-going ships, no similar effort is being made in the case of the Port of London. The chief reason for this failure would seem to lie in the division of control which distinguishes the Port of London from the other principal ports both of this country and of the Continent. Liverpool has its Mersey Docks and Harbour Board, and Glasgow its Clyde Navigation Trustees, representative bodies which exercise sole control over those respective ports. But in the case of London no fewer than fifty-six authorities, some of them deriving their *locus* from mediæval times, are concerned in one way or another in the management of the port, without any single one of them possessing complete power over the river, the port, navigation, shipping, or other services. The result is that none of the authorities has either the necessary funds or the necessary powers to carry out such a comprehensive scheme for the improvement and development of the river and port as is absolutely essential if it is to successfully compete with its rivals. The demand for some alteration of the existing unsatisfactory state of things became so urgent that in June 1900 a royal commission was appointed 'to inquire into the present administration of the Port of London and the water approaches thereto; the adequacy of the accommodation provided for vessels, and loading and unloading thereof; the system of charge for such accommodation, and the arrangements for warehousing dutiable goods; and to report whether any change or improvement in regard to any of the above matters is necessary for the promotion of the trade of the port and the public interest.' Two years later the royal commission made their report. Their main recommendation, upon which all their other suggestions hinged, was that the whole of the tidal river and the undertakings of the three dock companies should be placed under the sole control of a new port authority, consisting of forty representatives of the London County Council, the City Corporation, the Admiralty, the

Board of Trade, shipowners, traders, and other interests. It was also recommended that this port authority should spend £4,500,000 on dock extension, and £2,500,000 for the deepening of the river, and that the interest on the port stock to be issued for the purchase of the docks and the payment for the new works, estimated at between £30,000,000 and £40,000,000, should be guaranteed by the London County Council. A bill embodying, in the main, the recommendations of the commission was introduced by the government in the session of 1903, and referred to a joint-committee of the two houses. The bill was carried over till the session of 1904, but in consequence of the opposition it evoked, the government dropped it. The London County Council, however, promoted a bill in the session of 1905, which, though largely a transcript of the government bill of 1903, differed materially from that measure in the provisions relating to the compensation of dock debenture holders and the financial powers and constitution of the port authority. The bill was thrown out in April, so that it may be said of the Port of London problem, as of the London traffic problem, that it still awaits solution.

LONDON UNIVERSITY, South Kensington, S.W.—The history of the foundation of the University of London is a little involved. In 1827 an appeal for funds was made for a university open to students of every religious belief, when no less than £160,000 was subscribed. The foundation-stone of the institution in Gower Street—known in its early days as the London University, and now known as University College—was laid in the same year by the Duke of Sussex, and in the following year classes in the faculties of arts, law, and medicine were opened. Owing to the opposition of various chartered bodies and of the promoters of King's College, which was opened (1831) to provide an education of university character combined with instruction in the doctrines of the Established Church, it was not till 1835 that the Privy Council decided to incorporate the new institution under the name of London University College, and to establish a distinct examining body to be called the University of London, which should have the power of conferring degrees on students of approved schools and colleges without the imposition of any religious test or disqualification whatever. The compromise was willingly accepted by the promoters of the original institution, and on the same day

(Nov. 29, 1836) charters were duly granted by King William IV. to London University College and to the University of London, provision being made that the university should be under the general control of the government. Only the main events in the history of the new university since its incorporation can here be mentioned. In 1854 the university was given the privilege, already enjoyed by Oxford and Cambridge, of granting degrees in medicine. Four years later, by the charter of 1858, the connection between the university and its affiliated colleges was practically abolished, the examinations, excepting only those in medicine, being thrown open to all comers. Special examinations for women were inaugurated (1867), and in the same year the members of Convocation, consisting of graduates of three years' standing, were given the privilege of sending a representative to Parliament, Robert Lowe being elected (1868), Sir John Lubbock (1880), and Sir Michael Foster (1900). The new buildings in Burlington Gardens were inaugurated by Queen Victoria (1870). The special examinations for women met with little success, and in 1878 it was decided that every degree, honour, and prize awarded by the university should be made accessible to students of both sexes on perfectly equal terms. This was the last event of general interest before the reconstitution of the university in 1900.

Towards the close of the 19th century a feeling arose, and gradually gained strength, that, while the work of examining might be allowed to continue unimpaired and unrestricted, a great deal more might be done in the direction of supervising the teaching of university character in colleges in or near London. In 1892 a royal commission, generally known as the Gresham Commission, with Earl Cowper as its chairman, inquired into all questions relating to the university work in London; and finally, after prolonged and vigorous controversy, the University of London Act was passed (1898), by which commissioners were appointed whose chief duty was to frame statutes which were signed and sealed by the commissioners (Feb. 13, 1900) and approved by Parliament (June 29 following). The university now consists of the chancellor, the existing fellows for their respective lives, the senate, the graduates, and the students. Professor A. W. Rücker, M.A., D.Sc., F.R.S. (now Sir Arthur Rücker), was appointed principal of the university (1901). The former examining work of the university has been continued

without any break of continuity, the senate being advised in this part of its work by a council for external students. But since the reconstitution a great change has taken place in the relation between the university and the various colleges and institutions within the prescribed circle of thirty miles round the university. Any such public college or institution, in which the teaching is of university character, may apply for recognition as a 'school of the university,' whose students, known as 'internal students,' are allowed, after they have passed through the courses of study prescribed, to enter for the internal examinations, which are generally distinct from the external examinations. The courses of study and the teachers of these colleges are also recognized, provided they fulfil the prescribed conditions. To meet the needs of certain institutions, such as the London polytechnics, whose work is only in part of university character, it was provided that teachers in these institutions might be recognized, and that students who had attended the prescribed courses of study under such teachers should enjoy all the privileges of 'internal students.' The 'schools' of the university include University and King's Colleges, the medical schools attached to the eleven great hospitals of London, the Royal College of Science, the Central Technical College, the London School of Economics, seven theological colleges, three colleges for women—*viz.* Bedford College, Holloway College, and Westfield College—and one agricultural college, Wye College—the last being the only school of the university situated beyond the appointed radius. The senate, acting on the advice of an academic council, is now able to exercise a strong and healthful influence over the higher education of the metropolis. Arrangements have been made whereby teachers in the university are consulted, through the university boards of studies, with regard to courses of study and schemes of examination, and they thus exert a far greater influence over the study and examination of their own students than was possible under the old conditions. The good effects of the reconstitution have shown themselves in many other ways. University work in all parts of London has been stimulated or quickened, and the university is now taking its proper place as the head of a great academic system. Complete schemes of study in all subjects, including intercollegiate courses in the higher branches, have been organized. University

College will probably be incorporated with the university very shortly by a special act. The Worshipful Company of Goldsmiths have presented to the university their great institution at New Cross known as the Goldsmiths' Institute. Schemes are on foot for the establishment of two new colleges at S. Kensington—one for preliminary and intermediate medical studies, and the other for higher technological work. A research laboratory in physiology has been opened in the university, and arrangements have been made for the education of university candidates for commissions in the army. The important work of the London University Extension Society has been transferred wholly to the university, which also undertakes the examination and inspection of secondary schools, these departments being under the control of a special board. It may be of interest to note that in 1905 there were 750 recognized teachers and 2,600 registered internal students.

Degrees are now given both on the internal and external sides in arts, divinity, science (including degrees in agriculture, economics, engineering, and veterinary science), medicine, music, and laws, special care being taken that the standard of the examinations shall be maintained under the new conditions, and that the standards at the corresponding internal and external examinations shall be equivalent. Exemption from matriculation is granted to students, both on the internal and external sides, who have passed examinations accepted by the senate as equivalent; and graduates of other universities are allowed to enter on the internal side for the higher degrees of the university without first taking one of the lower degrees. Research has been much stimulated by the system now in vogue of granting higher degrees in the various faculties, chiefly on theses embodying the results of the candidates' original work. The degrees of the University of London have always enjoyed a good reputation both for the high standard of knowledge which has always been demanded, and for the strict impartiality of the examinations; and there is every reason to believe that organization of the teaching and research on the internal side will add considerably to its prestige and influence.

LIVERY COMPANIES.—The Livery Companies, one of the peculiar appurtenances of the City of London, are the successors of the craft guilds. The guilds were voluntary associations, governed by ordinances of their own fram-

ing, which regulated, and to some extent controlled, the trades carried on in the city. They appointed overseers to inspect the wares produced or sold, and umpires to adjudicate in cases of dispute between masters and workmen. In the reign of Edward III. charters were granted to these voluntary associations, and their ordinances formally recognized and enrolled in the Lord Mayor's court. Each company assumed a distinctive livery, and it is to this fact that they owe their present name, though there is no reference to them as 'livery companies' in the original charters. The companies continued for some time to exercise the functions of the guilds; but their decay as trade organizations began in the early part of the 16th century, and during the last four hundred years they have generally been mainly identified with acts of hospitality and benevolence. A few of them, however, and most notably the Worshipful Company of Clothworkers, have remained faithful to their former associations, and still devote large sums to the advancement of the industries over which they once exclusively presided. The ordinary constitution of a livery company embraces the master, wardens, the court of assistants, a livery, and a general body of freemen. The master was originally nothing more than the upper warden; and the Fishmongers and Goldsmiths still retain this principle, and term their chief executive officer prime warden. The livery was so called from the ancient practice of the periodical delivery of clothing to the members of the company. A liveryman of the guilds who resides within twenty-five miles of the city borders has a vote in the parliamentary elections for the city. The number of such voters is between 7,000 and 8,000. There are seventy-six 'city companies,' to adopt their everyday designation. Twelve of these are known as the 'great' companies, the remainder as 'minor' companies. The majority of the 'great' companies are possessed of immense wealth. Taking them in the order of civic precedence, their total trust and corporate income in 1904 was as follows:—Mercers (first charter, 1393), £111,000; Grocers (1428-9), £38,000; Drapers (1364), £78,000; Fishmongers (1272), £58,692; Goldsmiths (1327), £59,000; Skippers (1327-8), £44,000; Merchant Taylors (1299-1300), £50,000; Haberdashers (Henry VI.), £58,000; Salters (Edward III.), £22,000; Ironmongers (1464), £23,000; Vintners (1364), £11,000; Clothworkers (1527-8), £60,000. The wealthiest of the 'minor' companies are the

Leathersellers, £23,000; Brewers, £17,500; Saddlers, £12,200; and Carpenters, £11,638. Much of this wealth is devoted to educational purposes. The City and Guilds of London Institute, for the advancement of technical education, was founded in 1877 by the companies, who contribute the larger part of its annual income of £35,000. The Clothworkers' Company promoted the establishment of Yorkshire College, Leeds, now merged in the Yorkshire University. Merchant Taylors' School was founded in 1531 by Sir Thomas White and the Court of the Merchant Taylors' Company, who are to-day the governing body of the school. The companies largely subsidize the universities of Oxford and Cambridge in the matter of exhibitions; the Drapers' Company provide a large number of scholarships at the East London Technical College; and between thirty and forty schools in London and the provinces are supported to a considerable extent out of the private income of the companies. It is estimated that they spend about £75,000 a year on educational purposes. They contributed £13,000 to the establishment of the Royal College of Music; and during the ten years 1839-79 the London Hospital received £28,500 from the Grocers alone. The companies expend annually about £75,000 of their trust income on the support of their almshouses and in the relief of poor members, and many thousands a year on benevolent and public objects of a general character. They possess thirty-eight halls in London, the rateable value of which is placed at about £60,000 a year. The value of their plate (which includes some of the finest and rarest specimens of antique silver known to connoisseurs) and furniture is estimated at £320,000; while the capital value of the whole of their property was, in 1880, put at the figure of £15,000,000. A royal commission was appointed in 1880 to inquire into the circumstances and dates of the foundation of the city livery companies, the objects for which they were founded, and how far those objects were now being carried out. The commissioners reported in 1884, but the recommendations they made have never been given effect to by Parliament. See Herbert's *Hist. of the Twelve Great Livery Companies of London*, Hazlitt's *Livery Companies of the City of London* (1892), and *Report of the Royal Commission* (5 vols. 1884).

Bibliography.—The earliest work on London was that of John Stow, *A Survey of London* (1598), republished as *Survey of the Cities of London and Westminster*, continued from 1683 to

1720 by Strype (1720; new ed. 1842). See also Besant's *London* (1892), *History of London* (1893), *Westminster* (1895), *South London* (1899), *East London* (1901), *London in the 18th Century* (1902), *London in the Time of the Stuarts* (1903), *Holborn and Bloomsbury* (1903), *The Thames* (1903), *London in the Time of the Tudors* (1904), with Besant and Mitton's *Westminster* (1902), and *Strand District* (1902); Lethaby's *London before the Conquest* (1902), Thornbury's *Old and New London* (1898), *The Queen's London* (1895); Hutton's *Literary Landmarks of London* (1892); Hopkins's *The Boroughs of the Metropolis* (1900); Walford's *Greater London* (1901); Hare's *Walks in London* (7th ed. 1901); Loftie's *Hist. of London* (1884); Villars's *London and its Environs* (1887); Loftie's *Kennington* (1888); Hare's *Westminster* (1894); Sharpe's *London* (1894); Cunningham's *Handbook to London* (new ed. 1891); Hueffer's *The Soul of London* (1905); Barton's *Familiar London* (1904); Wyllie's *London to the Nore* (1905); Marshall and Miss Mitton's *The Scenery of London* (1905); Norman's *London Vanished and Vanishing* (1905); Cripps's *Position of the London Water Companies* (1892); Firth's *Municipal London* (1876); Hunt's *London Local Government* (1897); Seager's *Government of London under the London Government Act, 1899* (1899); *The London Manual* (yearly); and the statistics published annually by the London County Council.

London, a British first-class battleship launched in 1899. The name has been borne by ships that were present at the battle of Lowestoft (1665), the 'St. James' Fight' (1666), the battle of Solebay (1672), Bridport's action (1795), the battle of Copenhagen (1801), the capture of the *Marengo* and *La Belle Poule* (1806), and the bombardment of Sebastopol (1854).

London, tn., Middlesex co., Ontario, Canada, on the river Thames, 116 m. s.w. of Toronto. It is in the centre of a rich agricultural district; has several factories, foundries, and chemical works, and extensive petroleum refineries. The sulphur springs in the neighbourhood are much resorted to. Pop. (1901) 37,980.

London and North-Western Railway. This railway was the first to open a station (Euston) in London. It was incorporated (1846), being an amalgamation of the London and Birm' gham, the Liverpool and Manchester, Grand Junction, and the Manchester and Birmingham Rys. The company owns a total mileage of 1,719, the main line extending from Euston, London, to Carlisle in the north, to Leeds in the east, and to Liver-

pool and Holyhead in the west. The authorized capital of the company is £129,775,853; and for the half-year ending June 30, 1905, the receipts were £7,019,593, and the expenditure £5,957,482. The dividend on the ordinary stock in 1904 was 5½ per cent. The rolling stock comprises 3,055 locomotives, 9,580 coaches run on passenger trains, and about 75,000 goods trucks. The company also owns a fleet of seventeen steamers, carrying passengers and cargo between Holyhead and Dublin, Holyhead and Greenore, and on Carlingford Lough.

London and South-Western Railway Company. Originally established (1834) as the London and Southampton Ry., the name was changed to its present title when an act was obtained to make a branch line to Portsmouth (1839). The mileage owned and worked over is now 1,009, the main lines extending to Southampton, Portsmouth, Weymouth, Plymouth, Ilfracombe, Bude, and Bodmin. Waterloo Station is the London terminus. The total capital is £45,384,597; and for the year 1904 the receipts were £5,266,688, and the expenditure £3,239,004. The dividend on the ordinary stock for 1904 was 6 per cent. The rolling stock includes 736 locomotives, 4,171 passenger coaches, and 14,233 trucks of various kinds. The company owns a fleet of eighteen steamers, carrying passengers and cargo between Southampton and France and the Channel Islands, and between Lymington and the Isle of Wight. It is also part owner of the steamers plying between Portsmouth and Ryde. The Southampton Docks (including the 'Empress Dock', 18½ ac., and two of the largest graving docks in the world) also belong to this company.

London, Brighton, and South Coast Railway. Originated (1835) as the London and Croydon Ry., the main line from London to Brighton being completed (1841). Until 1845 the atmospheric system was in use between London and Croydon, and the company was amalgamated under its present title (1846). The main lines of the company run to Brighton, Eastbourne, and Portsmouth, but serve all the coast towns between Hastings and Portsmouth, the total mileage owned being 431. The capital created is £21,725,775, exclusive of loan capital; and the receipts for the half-year ending June 30, 1905, were £1,560,833, and the expenditure £967,862. The dividend paid on ordinary stock in 1904 was £5. 12s. 6d. per cent., and for the half-year ending June 30, 1905, £1. 12s. 6d. per cent. The rolling stock comprises 535 locomotives,



London Landmarks, Old and New.

1. Law Courts. (Photo by York.) 2. Marble Arch. 3. Trafalgar Square, looking towards Westminster. (Photo by G. W. Wilson.) 4. Albert Memorial and Albert Hall. 5. New Gladstone Statue, Strand. 6. The New Gaiety Theatre, Strand and Aldwych. 7. Strand improvements: the Savoy Hotel extension. 8. New War Office. 9. Hotel Russell.

3,199 passenger coaches, with 13,273 goods wagons. The company also owns a fleet of steamers, carrying cargo between Newhaven and Caen, the fleet running between Newhaven and Dieppe being owned jointly with the Western Railway Co. of France.

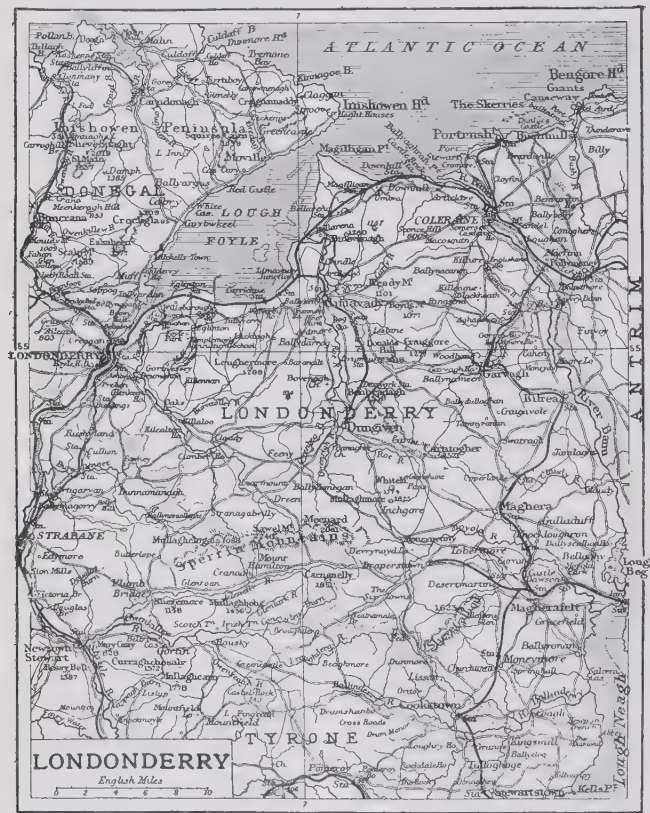
London Clay, a formation of Lower Eocene age, is the substratum on which most of London is built. It is a tough, compact clay in which traces of bedding are rarely seen, and, though usually red or brown at the sur-

face, have been opened in the London Clay, especially near the edges of its outcrop, where sand can be obtained to mix with it. It rests on the Oldhaven and Thanet beds. As a rule, it contains few fossils, but in some places shells, remains of plants, birds, fishes, and quadrupeds are found. Often there are bands of large calcareous septaria in the London Clay, which have been used for the manufacture of cement. The London Clay is a marine deposit, apparently laid down near the

northern coast and Lough Neagh. The principal rivers are Foyle, Faughan, and Bann, flowing north, and Moyola into Lough Neagh. Agriculture is the chief industry, and linen is manufactured. The fisheries are valuable. The county is divided into six baronies, and returns two members to Parliament. The greater part of the county was made over by James I. to the Common Council of London and its connected companies. In 1613 the Irish Society was incorporated, and this, with the Mercers' Company, still retains proprietary rights in the county. Area, 816 sq. m. Pop. (1901) 144,400. (2.) Or DERRY, munic. and parl. bor., city, and cap. of above co., 144 m. N.W. of Dublin. It is situated on a hill, partly surrounded by the Foyle, about 4 m. above its expansion into the lough. The walls, about 1 m. in circuit, were constructed early in the 17th century. The present cathedral of St. Columb—an embattled edifice, built 1633, and subsequently enlarged—occupies the summit of the hill, and adjacent is the bishop's palace. Shirt-making is the principal industry, and there are distilleries, foundries, tanneries, and a shipyard. In 1688-9 took place the memorable siege by the forces of James II. Pop. (1901) 39,892. See Dwyer's *The Siege of Londonderry* in 1689, and Waddington's *Guide to Londonderry* (1896).

Londonderry, CHARLES STEWART VANE-TEMPEST-STEWART, MARQUIS OF (1852), English statesman, was born in London, and educated at Eton and Oxford. As Viscount Castlereagh he occupied a seat in the House of Commons (1878-84), when he succeeded to the marquise. Lord Londonderry was lord-lieutenant of Ireland (1886-9), chairman of the London School Board (1895-7). He became Postmaster-general, and was admitted to the cabinet (1899). Lord Londonderry was President of the Board of Education in the Balfour administration (1902-5), and on the retirement of the Duke of Devonshire from the government (1903), he also held the office of Lord President of the Council.

London Gazette, THE, official organ of the state, has been published now for nearly two hundred and fifty years. It first appeared in November 1665, under the title of *The Oxford Gazette*, when the court of Charles II. had been driven to Oxford by the plague; but in the following February the title was changed to that by which it has ever since been known. The first editor, or gazetteer, was Joseph Williamson, under-secretary of state; and among others who after-



face, is typically blue-gray at greater depths, owing to the presence of sulphide of iron. The London Clay is very impervious to moisture, and forms a soil which is damp and cold in winter, while in summer it bakes hard and cracks with the drought. It becomes slippery when wet, and houses which have not sufficiently substantial foundations often develop cracks in their walls. Around London and in the lower part of the Thames valley the London Clay covers a large area. Many brick fields

mouth of a river. See Lyell's *Principles of Geology* (12th ed. 1875), Whittaker's *Geology of London* (1889), and Bowerbank's *Fossils of the London Clay* (1840).

Londonderry. (1.) Maritime co., Ulster, Ireland, with seaboard extending between the Bann and Lough Foyle. In the S.E. it is washed by Lough Neagh. The surface is in great part mountainous, the highest point being Mt. Sawell (2,236 ft.), on the southern border. There are many fertile valleys and low-lying tracts, especially near the

wards held the post was Sir Richard Steele. The position was much coveted, and was bestowed by the government of the day as a reward for services rendered in political controversy. Down to 1696 a version of the *Gazette* was published in French as well as English. At the present day the *Gazette* is wholly occupied with proclamations of state, promotions, appointments, transfers and retirements of naval and military officers, official and legal announcements, and advertisements inserted in compliance with the law or the order of the courts. The *Gazette* is published twice a week, on Tuesday and Friday. A similar *Gazette* for Scotland is issued bi-weekly in Edinburgh, and one for Ireland in Dublin.

London Military District. The Army Order of Jan. 6, 1905, by which the military commands and staffs of the United Kingdom were reorganized, constituted London a separate district. The area includes the London County Council district in Middlesex, the depot of the brigade of Guards at Caterham, and, so far as the household troops are concerned, Windsor. For the purpose of the annual summer training of the household troops, the camps at Pirbright, Surrey, are also included in the London District.

London Pride, or **NONE-SOPRETTY**, is a little evergreen plant, *Saxifraga umbrosa*, one of the commonest plants in town and cottage gardens. From pretty green rosettes of leaves spring numerous tall, quaint, hairy flower-stalks, bearing panicles of little flowers. Each of the five small white petals is dotted with red, and towards the centre of the flower with yellow; whilst the erect white stamens are terminated by anthers, coloured terra-cotta.

Long, LOCH, arm of the sea between Argyllshire and Dumbar-tonshire, Scotland, 5 m. N.W. of Greenock. Its western extension is known as Loch Gail. At its northern extremity are the village of Arrochar, and Ben Arthur, or the 'Cobbler' (2,891 ft.).

Long, GEORGE (1800-79), English classical scholar, born at Poulton, and educated at Cambridge, where his career was marked with brilliant success. He held professorships at Charlottesville, Virginia (1824-8), and in the newly-founded University of London, now University College (1828-31), and again from 1842 to 1846. He edited several atlases, classical and modern, a *Political Dictionary*, the series known as the *Bibliotheca Classica*, and published *Two Discourses on Roman Law* (1847), and the *Decline of the Roman Republic* (1864-74); also manuals of Greek and

Latin grammar and etymology. See Mathews's *In Memoriam* (1879).

Long, JOHN DAVIS (1838), American jurist and statesman, born at Buckfield, Maine. He was a member of the state legislature of Massachusetts (1875-8), of which state he was governor for three years (1880-2). He was thrice elected to Congress, and in 1897 became secretary of the United States navy, which office he administered with ability during the Spanish-American war.

Long, WALTER HUME (1854), English statesman, born at Bath; educated at Harrow and Oxford, and entered Parliament (1880). He sat for a constituency in Wiltshire, his native county, until 1892, when he was defeated, but was returned (1892) for the West Derby division of Liverpool, and afterwards for S. Bristol (1900). In the second Salisbury administration (1886-92) he was appointed parliamentary secretary to the Local Government Board, and on the formation of the coalition government (1895-1900) he was made President of the Board of Agriculture. When the government was reconstructed (November 1900), Mr. Long was made President of the Local Government Board, a post to which he was again appointed in 1902. In March 1905 he became Chief Secretary for Ireland on the retirement of Mr. George Wyndham, a position which he held till Mr. Balfour's resignation in December of that year.

Longan, the name given to an Indian evergreen tree, *Nephelium longana*, which grows to almost twenty feet in height, and bears in late spring loose panicles of small white flowers. The flowers are followed by yellow globose berries, containing white, tart, juicy pulp.

Long-boat. The largest boat in a ship, furnished with mast and sails, as well as with pulling gear. In old times the chief use of a long-boat was for cruising short distances after merchant ships of the enemy, and for this purpose it was armed. It was also employed for excursions against smugglers, for impressing seamen in the days of the press-gang, and for taking the heavier stores and provisions on board.

Long Branch, fashionable seaside resort, Monmouth co., New Jersey, U.S.A., 45 m. S. of New York, and within easy reach of it by steamer. Pop. (1900) 8,872.

Longchamp, pleasure resort in the Bois de Boulogne, W. of Paris. Its abbey, founded in 1260, was, until its suppression in 1792, a centre of musical attraction during Holy Week. The race for the Grand Prix is run over Longchamp course.

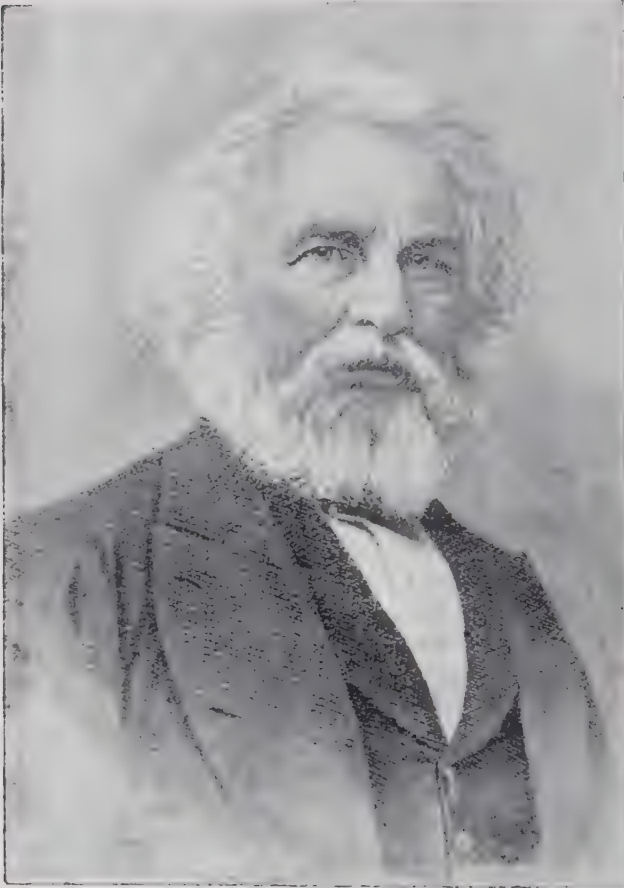
Longchamp, WILLIAM DE (d. 1197), a Norman of low birth, who won the confidence and favour of Richard I., under whom he rose to be bishop of Ely and chancellor. He was a strong opponent of the faction led by John, and throughout a loyal defender of Richard's interests in England, particularly in the matter of raising the king's ransom. His exactions rendered him generally unpopular, in spite of his great talents for government, organization, and diplomacy. See *Gesta Ricardi Regis*, and Boivin-Champeaux's *Notice sur Guillaume de Longchamp* (1885).

Longevity. In considering length of life from the biological standpoint, it is convenient to divide organisms into two categories—those with one reproductive period, and those which reproduce more than once. In the former the whole life history may be run through very rapidly, as in many of our garden annuals among plants; or the life may be divided into a prolonged vegetative period and a brief reproductive period. Thus the so-called biennials among plants accumulate food-stores during their first season, and use these up during the second or reproductive season. If the strain of reproduction be very heavy, then the vegetative period may be greatly prolonged, as in the familiar case of the Yucca. Quite similar conditions occur among insects, where the whole life history may be short, or, as in the May-flies or Ephemerides, larval life may be prolonged though the adult reproductive life is very short. In all such cases death ensues as soon as the needs of the new generation are provided for. Where there is periodical reproduction the matter is much more complicated. In the case of perennial plants, if the food-supply continue sufficient, there seems no reason why life should not be prolonged, unless through accident, almost indefinitely. The same is apparently true of many sluggish and sedentary animals. With most active and highly differentiated animals, however, the length of life is more or less definitely determined for the species, though the reason for the limit is not quite understood. It has probably something to do with size, for, generally speaking, small animals are shorter lived than large ones; but this is only approximately true, for queen ants are long-lived. Again, the length of life has something to do with the rate at which maturity is reached: man and the elephant alike come slowly to maturity, and are long-lived. On the whole, however, no general state-

ments can be laid down as to what determines the length of life, and the problem is greatly complicated by the fact that most of the available figures refer to animals under the artificial conditions of domestication or captivity. We have at present no means of knowing how frequently natural death occurs among wild animals.

he accepted the newly-founded chair of modern languages at Bowdoin College, Brunswick, his *alma mater*, with leave of absence for travel. He sailed for Europe in 1826, and during the next three years made a study of European languages, visiting France, Spain, Italy, and Germany. He entered upon his duties at Bowdoin in the autumn

at Harvard; but before entering upon his duties he paid another visit to Europe, particularly to the Scandinavian countries and Switzerland. His wife, Mary Storer Potter, whom he had married in 1831, died at Rotterdam in November 1835, and is commemorated in his poem *The Footsteps of Angels*. *Hyperion* (1839), a poetical romance which enjoyed immense popularity, reflects the combined influence of Richter and German romanticism on the poet. The heroine of the story, Frances Elizabeth Appleton, became his wife in 1843. Longfellow's career at Harvard began in 1836, and continued for seventeen years, during which time he faithfully discharged his duties, although these were often uncongenial. At his house in Cambridge, previously the residence of General Washington, he gathered around him a large circle of friends, including Agassiz, Hawthorne, Holmes, Lowell, Emerson, Felton, and Sumner. *Voices of the Night* (1839) and *Ballads* (1841) awakened the world to the fact that a new poetical force had arisen in literature. These volumes included such familiar pieces as *The Psalm of Life*, *Footsteps of Angels*, *The Skeleton in Armour*, *The Wreck of the 'Hesperus'*, *The Village Blacksmith*, *Excelsior*, and *The Beleaguered City*, all of them unequalled for simplicity of diction, tenderness, and pathos. Two years later a play, without any special merit, *The Spanish Student*, enjoyed an almost equal popularity. Longfellow paid a third visit to Europe in 1842, and on his return home he published his *Poems on Slavery*, a volume including *The Quadroon Girl*, *The Slave Singing at Midnight*, and *The Warning*, which went far towards awakening the American people to a sense of the injustice of negro slavery. *The Poets of Europe* (prepared in conjunction with Professor Felton), *The Belfry of Bruges*, *The Wail*, and *The Estray*, written between 1845 and 1846, widened the poet's fame. These were followed by *Evangeline* (1847), the greatest and best of his longer poems, written in dactylic hexameters, the sentiment of the poem being exquisitely adapted to its measure. *Kavanagh* (1849) proved a failure; but *The Seaside* and *The Fireside* (1850), a volume of minor poems written in a most engaging form, was more successful; and equally so was *The Golden Legend* (1851)—a romance of the middle ages, based on Hartmann von Aue's *Der Arme Heinrich*—ranking next to *Evangeline*, and containing many passages of rare beauty. Longfellow resigned his chair at Harvard



Henry Wadsworth Longfellow.

Longfellow, HENRY WADSWORTH (1807-82), the greatest of American poets, was born at Portland, Maine, on Feb. 27, 1807. He was the son of Stephen Longfellow, a Portland lawyer, and Zilpah, daughter of General Peleg Wadsworth, a descendant of John Alden and Priscilla, the 'Puritan maiden' whose fame the poet has preserved in *The Courtship of Miles Standish*. In 1825 he entered his father's office; but disliking the study of law,

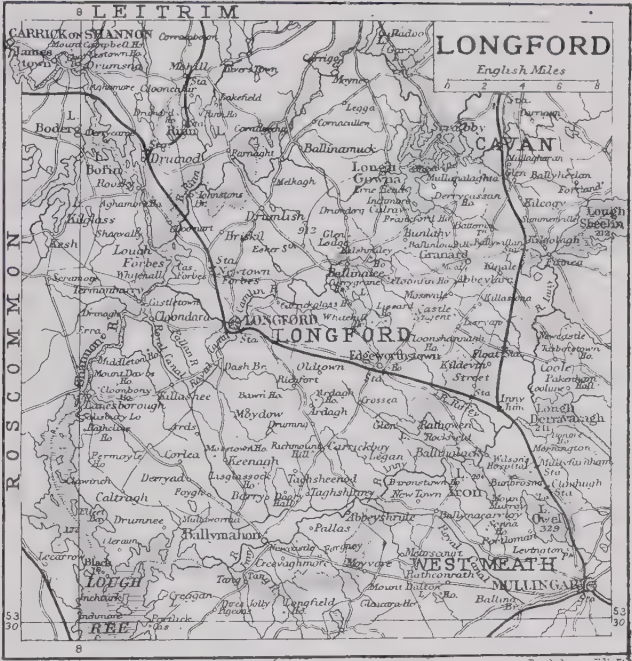
of 1829, and proved eminently successful as a teacher. Longfellow published a translation of *Las Coplas* of Don Jorge Manrique (1833), which is said by Professor Torricelli to excel the original in power and literary ease. In the same year he issued a portion of *Outre Mer*, a fruit of his European travel, the second part of which appeared in 1835. A year later he succeeded George Ticknor, the Spanish historian, as professor of modern languages

(1854) in order to devote himself more freely to purely literary work. *Hiawatha* (1855), a legend of the North-East Indians, the outcome of his new and welcome leisure, was written in the trochaic tetrameter measure of the Finnish epic *Kalevala*. The metre, which readily lends itself to ridicule, and is by some considered monotonous, suits the subject, and proves fascinating to most ears. It ran through thirty editions in one year. *The Courtship of Miles Standish* (1858), a romance in hexameters founded on the early history of the Plymouth colony, tells in grim and realistic tones of the hardships and struggles of the 'Pilgrim fathers'; but the beautiful story of the noble and womanly love of Priscilla makes us forget all blemishes in the poem. A collection of minor poems, *Birds of Passage*, appeared simultaneously with *Miles Standish*. In 1861 Longfellow's wife was burned to death in his presence, and from this shock the poet never recovered, although in time he resumed his writing. His charming *Tales of a Wayside Inn* appeared in 1863; a second series of the *Tales* was published in 1872, and a third in 1873. *Flower de Luce and Other Poems* appeared in 1867, *New England Tragedies* in 1868, and *The Divine Tragedy* in 1871, the last a poetical rendering of Leiden's history of Christ. The two last-named works, together with *The Golden Legend*, appeared in 1873 in one volume, under the title of *Christus, a Mystery*. Longfellow's later poems, which show few signs of his advancing years, include *Aftermath* (1874), *The Masque of Pandora* (1875), *Kéramos* (1878), *Poems of Places* (in 31 vols. 1875-78), *Sonnets* (including the five sonnets entitled *Three Friends of Mine*), a translation of Dante's *Divina Commedia* (1871), *Ultima Thule* (1880), and *Hermes Trismegistus* (1880).

It is difficult to estimate Longfellow's real place among the poets of the world. In imagination and intensity of feeling he is not to be compared with poets of the first rank, yet his poetical powers were of a high order, and his sense of proportion and of melody was exquisite. Moreover, he was a man of great mental and moral refinement, of high ideals and broad humanity, perhaps the most essential qualities in modern poetry. See *Life* by his brother, the Rev. Samuel Longfellow (1886); *Final Memorials of H. W. Longfellow* (1887), by the same author; Higginson's *Old Cambridge* (1889), and a *Life of Longfellow* in *American Men of Letters* (1902); and Carpenter's *Longfellow*, in the *Beacon Biographies* (1901).

Longford. (1.) Inland co., Leinster, Ireland. It has extensive tracts of bog; on the Leitrim border are bare hills, and in the centre and s. good grazing land. The Shannon, on w. border, expands s.w. into Lough Ree; other rivers are Inny and Camlin. Pasturing and agriculture are principal industries. The county returns two members to Parliament. Area, 421 sq. m. Pop. (1901) 46,672. (2.) Town, cap. of above co., 9 m. w. by N. of Edgeworthstown. It is an agricultural centre, and has military barracks. The seat of the Roman Catholic bishop of Ardagh and Clonmacnoise, its cathedral is a fine structure of

and philosophical works of his are mentioned, but they are all lost. The great work *De Sublimitate*—the finest example of ancient literary criticism—attributed to him, is probably of earlier date. See ed. by Rhys Roberts (1899); Saintsbury's *Hist. of Criticism* (1900-4). **Long Island.** (1.) Large isl. forming part of New York state, U.S.A. It lies off the coast of that state and Connecticut, separated from them by Long Island Sound. Brooklyn and Queen's boroughs of New York city are situated at its western end. Its area is 1,680 sq. m. Pop. (1900) 1,452,611. (2.) L. I. CITY, formerly a city of Queen's co., New



the Ionic order. There is also a Roman Catholic college. Pop. (1901) 3,747. **Longinus, DIONYSIUS CASSIUS** (c. 213-c. 273 A.D.), a famous Greek rhetorician, whose place of birth was most likely Athens. Late in life he went to Emesa in Syria, where he met Zenobia, queen of Palmyra, who induced him to become her teacher of Greek literature. After the death of her husband he was her chief adviser, and counselled her to throw off her allegiance to Rome, the result of which was that (273 A.D.) the Emperor Aurelian captured and destroyed Palmyra and executed Longinus. A number of critical, rhetorical,

York, U.S.A., 5 m. N.E. of Brooklyn, at w. end of Long I. It is now included in the borough of Queen's, New York city, and is one of the five boroughs which are united to form the city of New York. It was incorporated with New York on Jan. 1, 1898. Pop. (1900) 48,272. (3.) L. I. SOUND, separating Long I. from the coast of Connecticut. Length, over 100 m.; width, from 2 m. to 25 m. **Longitude.** See LATITUDE AND LONGITUDE. **Longmans,** a London firm of publishers, founded by Thomas Longman, a native of Bristol. Apprenticed when seventeen to John Osborne, a London pub-

lisher, he became his partner (1724), and at his death (1734) succeeded to the business. He was the first of five Thomas Longmans who have successively extended the firm. The Longmans have been associated as publishers with many famous names in English literature, among them Wordsworth, Southey, Coleridge, Moore (who had £3,000 for *Lalla Rookh*), Scott, Sydney Smith, Macaulay (who received £20,000 for 2 vols. of his *History of England*), Mill, Disraeli (to whom they paid £10,000 for *Endymion*), Froude, Max Müller, Jean Ingelow, Lord Avebury, and Andrew Lang. Lindley Murray's *Grammar*, published by the second Thomas Longman, reached its 70th edition in 1896. The *Edinburgh Review* (purchased 1826) is still the property of the firm. *Longman's Magazine*, a monthly journal of general literature established in 1882, was discon-

peachment of Laud, the abolition of the Star Chamber, and other special courts, and a bill preventing the king from dissolving Parliament without its own consent. On constitutional matters the members were unanimous, but on ecclesiastical questions a dispute arose which eventually led to the civil war. In 1647, while negotiations were being conducted with the king, a conflict broke out between the Parliament and the army, which ended in the expulsion by the latter ('Pride's Purge') of ninety-six Presbyterian members, and the arrest of forty-six, leaving about fifty members, afterwards known as the 'Rump.' This remnant was responsible for the execution of the king and the establishment of the commonwealth. In 1654 it was turned out by Cromwell, and did not reassemble till nearly six years later (May 8, 1659). It was again expelled

civil war. He took an important part in the battles of Bull Run and Fredericksburg, held a command under Lee at Gettysburg, and was mainly responsible for the victory of Chickamauga, where he was severely wounded. After the war he held various civil posts, and served as minister to Turkey (1880-81). He published *From Manassas to Appomattox* (1896).

Longton, munic. bor. in the Potteries dist., Staffordshire, England, 2½ m. E.S.E. of Stoke. China and earthenware are the staple industries. There are valuable coal and iron mines in the vicinity, also blast furnaces. Pop. (1901), 35,815.

Longwy, tn., dep. Meurthe-et-Moselle, France, near Belgian frontier, 18 m. S.W. of Luxemburg, is divided into a lower and upper town, the latter of which is strongly fortified. It has mines of iron ore. Pop. (1901) 9,235.

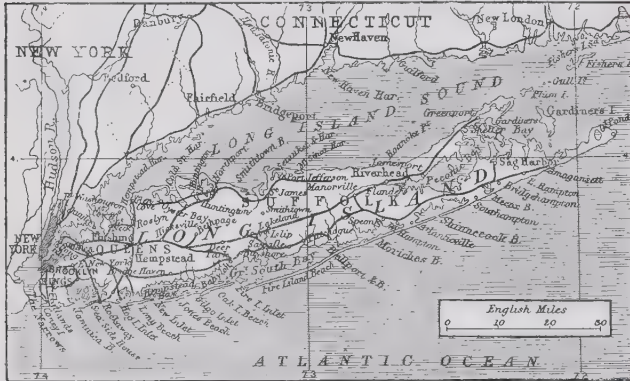
Long Xuyen, or LONG CHUYN, tn., Lower Cochinchina, on the Bassac, 30 m. S.E. of Chaudoc. Long Xuyen communicates with the Gulf of Siam by the canal of Rachgia. Pop. (arrondissement) about 95,000.

Lonicera, a genus of hardy and half-hardy shrubs belonging to the order Caprifoliaceæ; characterized by flowers with a small, five-toothed calyx, a five-lobed tubular corolla usually with an irregular limb, five stamens, and a knobbed stigma. The only true British native species is *L. periclymenum*, the common woodbine or honeysuckle of our hedges; but many species are cultivated in our gardens and greenhouses. Some of the most beautiful are the half-hardy evergreen twiner, *L. sempervirens*, with whorls of scarlet and yellow flowers; *L. tartarica*, with pinkish flowers; *L. caprifolium*, with blue and yellow flowers; and *L. fragrantissima*, with white, richly-scented flowers.

Lonigo (anc. *Leonicum*), tn., prov. Vicenza, Venetia, Italy, on river Gua, 23 m. W. of Padua; has mineral springs. Pop. (1901) 10,403.

Lonneker, vil., prov. Overijssel, Netherlands, 3 m. N. of Enschede; has cotton and thread mills. Pop. (1899) 10,951.

Lönnrot, ELIAS (1802-84), Finnish scholar, born at Sammatti, Nyland. He collected and edited the folk-songs of his people—*Kantele* (1829-31), their great epic of *Kalevala* (1835), their lyrical poetry (*Kanteletar*, 1840), and collections of proverbs (*Sanalaskuja*, 1842) and riddles (*Arvoituksia*, 1844; new ed. 1861). He also issued an extensive Finnish-Swedish dictionary (1866-80). See *Life* by Ahlqvist (1885), and *FINLAND—Language and Literature*.



Long Island, New York.

tinued with the number for October 1905.

Longnon, AUGUSTE HONORÉ (1844), French scholar and historian, born in Paris; has been successively titular archivist in the imperial archives (1871), director of the *Bulletin* of the Historical Society of Paris and Ile de France (1875), professor at the Ecole des Hautes Etudes (1879) and the Collège de France (1892). His most important works are *Géographie de la Gaule au sixième Siècle* (1878), *Atlas Historique de la France, depuis César jusqu'à nos Jours* (1884-9), and *Polypytique de l'Abbaye de Saint-Germain-des-Près* (1886).

Long Parliament, the name commonly given to the fifth and last parliament of Charles I. It met on Nov. 3, 1640, and finally dissolved itself (March 16, 1660). The first few months of the Long Parliament were occupied with the trial of Strafford, the im-

(Oct. 13), but was restored (Dec. 26) in consequence of divisions in the army. On the entrance of Monk into London (Feb. 3, 1660) it agreed to dissolve, and issued writs for a general election.

Longridge, vil. near Longridge Fell, Lancashire, England, 7 m. N.E. of Preston; has cotton-spinning and weaving, brassfounding, and valuable stone quarries. Pop. (1901) 4,304.

Long Service Medal, MILITARY, a decoration awarded to a non-commissioned officer or private of the regular army who has served for eighteen years with an unblemished character. It carries with it a gratuity of five pounds, payable on discharge.

Longships Lighthouse. See *LAND'S END*.

Longstreet, JAMES (1821-1904), American general, born at Edgefield, S. Carolina; distinguished himself in the Mexican war, and with the Confederate army in the

Lons-le-Saunier, tn., cap. of dep. Jura, France, near source of riv. Solman, 35 m. S.E. of Châlon-sur-Saône. Near it is Montmorot, famous for its brine springs. The town was the birthplace of General Lecourbe and of Rouget de Lisle, author of the *Marseillaise*. Trade in salt, wine, and agricultural produce. Pop. (1901) 12,935.

Loo, a card game. See GAMBLING.

Loo-choo or Lu-chu Islands (Jap. *Riu-kiu*) contain thirty-six principal islands, extending in a north-east to south-west direction from the Gulf of Kagoshima, in S. Japan, to Formosa, between lat. 24° and 30° N., and long. 125° and 130° E. Of these the northern islands have long since fallen under Japanese rule. Loo-choo Proper lies between 26° and 27° N. lat., and consists of nine islands, of which the chief is Great Loo-choo or Okinawa, 56 m. long, and from 2 to 14 m. broad. In this is situated the old capital, Shuri, a few miles inland from the port, Naha or Naba. Unten (Port Melville) is a good harbour on the north-west coast. The islands are mostly volcanic, but in the south are some of coralline formation, and one (Tri-omote-jima), in the 'Further Isles,' is of limestone, and possesses rich coal mines. In Yakuno-shima the mountains are over 6,000 ft. high, but elsewhere they seldom exceed 2,000 ft.

At the close of the 14th century the king of Loo-choo recognized Chinese suzerainty, but homage was also paid to Japan. In 1874 China was compelled by Japan to abandon her claims, and in 1876 the islands were incorporated in Japan, and the king was carried to Tokyo, where he died (1901). The principal products are sugar-cane, sweet potatoes, rice, Indian corn, tobacco, indigo, and various cereals; and the exports include sugar, silk, cotton, and hempen fabrics, lacquer, and earthenware. The written language, manners, wedding and burial customs, are distinct from those of Japan and China. Pop. (1898) 453,550. See Basil Hall's *Voyage of Discovery to the West Coast of Corea and the Great Loo-choo Islands* (1818); Basil Hall Chamberlain's 'The Loo-choo Islands and their Inhabitants,' in *Geog. Jour.* (1895).

Loofah, a name given to the fibrous part of the fruit of the towel-gourd, *Luffa aegyptiaca*, order Cucurbitaceae. It is often used as a bath sponge in this country. The similar part of the fruit of *L. acutangula* is so used in the W. Indies, and also in the manufacture of baskets.

Lookout Mountain. See CHATTANOOGA.

Loom. See COTTON—Manufacture, and WOOLLEN TEXTILES.

Looming, the name applied by nautical men when distant objects appear abnormally elevated above their true positions. The illusory appearances are due to successive bending of the rays of light in their passage through atmospheric strata. The phenomenon is of the nature of the mirage. See MIRAGE.

Loomis, ELIAS (1811-89), American astronomer and mathematician, studied at Yale. After holding professorships at Hudson, Ohio (1837-44), and in the University of New York (1844-



Loofah, or towel-gourd.

1, Prepared loofah; 2, fibres.

60), he returned to Yale as professor of natural philosophy and astronomy (1860-89). He was the author of numerous works on natural philosophy, astronomy, and other scientific subjects, all marked by accuracy and precision. Loomis was also the author of a genealogical work, *The Descendants of Joseph Loomis*.

Loon, or LOOM, a popular term sometimes applied to the great northern diver on account of its clumsiness on land, but also used in Norfolk for the great crested grebe.

Loon, largest tn., isl. of Bohol, Philippines, on w. coast, 15 m. N.W. of Tagbilaran, has a good anchorage about 3 m. distant. Pop. 15,000.

Loosestrife. See LYSIMACHIA and LYTHRUM.

Lope, FELIX DE VEGA CARPIO (1562-1635), Spanish dramatist, born in Madrid, and educated at

the Jesuit College there. As a soldier, he fought at the Azores (1582) and in the Armada (1588), serving in several official posts, but all the while writing facile, witty verse. His first known play, *El Verdadero Amante*, was written when he was twelve years old. During the dreadful voyage with the Armada he wrote most of his *Hermosura de Angelica* (11,100 verses), an epic in imitation of the *Orlando Furioso*. Then followed a pastoral prose narrative, *Arcadia*, of which fifteen editions appeared in the author's lifetime. In 1598 appeared the famous epic poem on Sir Francis Drake, *Dragoneta*, a savage attack on the great seaman who had beaten the naval power of Spain. His sacred poem, *San Isidro*, followed (1599) one of his best works. Rhymes and sonnets by the hundred were issued during the next two years, and Lope was then acknowledged the first poet in Spain. He now devoted himself for some time to sacred poems, such as *Soliloquios* and *Los Pastores de Belen* (1612). He then became a priest and a 'familiar' of the Inquisition, but never slackened in his marvellous fecundity in every branch of letters. In drama alone he wrote 1,800 separate plays and 400 *autos* (religious pieces), of which 400 plays and 40 *autos* survive. A large number of the dramas are to be found in the series *Autores Españoles* by Hartzenbusch (1846-80). A complete edition of his *Obras* is in course of publication by the Spanish Academy. See Ticknor's *History of Spanish Literature*, vol. ii. (1849), Von Schack's *Geschichte der Dramatischen Literatur und Kunst in Spanien* (1845-46), Lord Holland's *Life* (1806), and Rennett's *Life* (1904).

Lope de Rueda. See RUEDA.

Lopes, SIR MANASSEH MASSEH (1755-1831), English politician, born in Jamaica, a descendant of a family of Spanish Jews. Lopes settled in England, abandoned Judaism, entered Parliament as member for New Romney (1802), and was made a baronet (1805). In 1819 his election for Barnstaple was petitioned against on the ground of bribery. He was unseated, and the same year was fined £1,000 and sentenced to two years' imprisonment for bribery at a previous election at Grampound. On his release he was returned for his pocket borough of Westbury (1823), but resigned (1826) to provide a seat for Peel, who had been defeated at Oxford.

Lopez, FRANCISCO SOLANO (1827-70), tyrant of Paraguay, was the son of Carlos Antonio Lopez, president of Paraguay. On his father's death he was appointed president, and immediately began to develop the unscrupulous and

ultimately suicidal policy of aggression for which he will be long remembered. Lopez was virtually dictator, and in 1865 declared war against Brazil and the Argentine Republic. Uruguay, the Argentine, and Brazil allied themselves against him, and the war was only closed by the death of Lopez (1870). See Washburn's *History of Paraguay* (1870).

Lophobranchii. See BOXY FISHES.

Loquat, the Japanese medlar or quince, is the fruit of a small tree (*Phloxia japonica*) which can be grown in the open air in sheltered parts of Britain. As it flowers in autumn, however, it requires glass protection in order to produce and ripen its fruit. The flowers are white, and are borne in drooping racemes, the edible, ovoid, orange-red fruit appearing in bunches.

Lorain, city of Lorain co., Ohio, U.S.A., 30 m. w. of Cleveland, on Lake Erie. It has a good harbour and a considerable trade in coal. Pop. (1900) 16,028.

Loranthaceæ, an order of parasitic evergreen shrubs, bearing usually small, inconspicuous, whitish flowers, followed by fruits containing a viscid substance often used as birdlime. The mistletoe (*Viscum album*) is the best-known species in Britain.

Lorca, city, prov. Murcia, S.E. Spain, 41 m. from Murcia. It was the scene of much strife between Moors and Christians in the 12th and 13th centuries. Wine is produced, and there are some lead mines in the neighbourhood. Pop. (1900) 69,886.

Lord. There are many uses of the word 'lord' in English in the sense of a master, or person possessing or entitled to authority. This appears from such widely different expressions as 'the Lord God,' 'our Lord Jesus Christ,' 'the lord of the manor,' 'her lord and master,' and the common word 'landlord.' But it is only necessary to consider here two uses of the word—first, as meaning a nobleman; and secondly, as an honorary title of certain official persons, used either in addressing them or as part of their designation. In the first sense all peers are lords temporal, and all archbishops and bishops (of the Established Church at any rate) are lords spiritual. It is often erroneously said that the lords spiritual and temporal are the archbishops, bishops, and peers who have seats in the House of Lords; but this mistake arises from the fact that Acts of Parliament are expressed as being made 'by and with the advice and consent of the lords spiritual and temporal and commons in this present Parliament assembled.' There are lords as well as com-

mons who are not in Parliament. By courtesy the eldest sons of peers above the rank of viscount assume a title, which is usually the second or some other title of their father. They do not always assume the same title. Thus the Marquis of Lansdowne's eldest son is in alternate generations called Earl of Kerry and Earl of Shelburne. Moreover, in some cases they assume a courtesy title which the father has not got. Thus the Earl of Belmore's eldest son is Viscount Corry, and the Earl of Lucan is Lord Bingham. The eldest grandson of a duke by his eldest son in some cases takes by courtesy a title of his grandfather. Thus Lord Dalkeith's eldest son (grandson of the Duke of Buccleuch) is called Lord Whitechester, and the present Earl Percy was called Lord Warkworth before his father succeeded to the dukedom of Northumberland. The younger sons of dukes and marquises assume by courtesy the title of 'Lord' before their Christian names, as Lord Archibald Campbell and Lord Charles Beresford.

Many holders of high office are called lord as part of their official title, as, for example, the Lords of the Privy Council, of the Treasury, and of the Admiralty, the Lord Chancellor, the Lord Privy Seal, the Lord Chamberlain, the Lord High Steward, and the Lord Advocate; the Lord-Lieutenant of Ireland, and the Lord-Lieutenants of counties, the Lord Chief-Justice, the Lord Justices of Appeal, and the judges of the Court of Session. The judges of the High Court in England are addressed 'My Lord,' but their title is 'Mr. Justice.' The mayors of London, Manchester, Liverpool, Birmingham, York, Cardiff, and Dublin are Lord Mayors; and the provosts of Edinburgh, Glasgow, Aberdeen, Dundee, and Perth are Lord Provosts.

Lord High Steward, the first of the great officers of state in England. Formerly he sat judicially in the Court of Claims to determine all claims to render service to the king or queen at a coronation. The duty is now usually discharged by a special committee of the Privy Council.

Lord Howe Islands, group of islands, S. Pacific, between Port Jackson and Norfolk I., 550 m. E. of Sydney, in 31½° S. lat. and 159° E. long. They belong administratively to New South Wales. The islands were discovered in 1788, and occupied in 1834. Vegetation is abundant, particularly banyan trees. Area, 5 sq. m. Pop. 100.

Lord-Lieutenant of Ireland, the head of the executive in Ireland. As representing the King

he holds courts, drawing-rooms, and other functions of a semi-regal nature. See IRELAND.

Lord-Lieutenants of counties were originally appointed in the reign of Henry VIII. to control the military forces of the crown. They also exercised many of the duties formerly performed by the sheriffs. In 1662 they were given entire control of the militia, but by the Militia Act, 1882, their functions were transferred to the crown. They must appoint twenty duly qualified deputy-lieutenants in each county approved by the crown, three of whom may act for the lord-lieutenant during absence. The lord-lieutenant may also appoint a vice-lieutenant, and he generally recommends county justices to the lord chancellor for appointment.

Lord Mayor's Day. See MAYOR.

Lord of the Isles. See ISLES, LORD OF THE.

Lords, HOUSE OF. See PARLIAMENT.

Lords-and-Ladies. See ARUM.

Lord's Day. See SABBATH.

Lord's Supper. See EUCHARIST.

Lorelei, or LURLEI, a famous rock on the right bank of the Rhine, near St. Goar, noted for the danger it offered to navigation and for a marvellous echo. From this originated the legend of the siren, a favourite theme of German poets. Heine has a well-known poem on the subject, but the earliest version is to be found in Brentano's ballad *Zu Bacharach am Rheine wohnt eine Zauberin*, written in 1800. The rock is now pierced by a railway tunnel.

Lorenz, ADOLF (1854), Austrian surgeon, was born in Silesia. After a distinguished career as a student at Vienna University, he graduated in 1880, and subsequently became professor of surgery there. In 1895 Professor Lorenz published a treatise on *Dislocation of the Hip*, and his method of treating congenital dislocation has acquired unenviable prominence through the indiscreet eulogy of the American press. The operation with which his name is associated consists—(1) in forcible rupture of such parts as resist reduction under an anæsthetic; and (2) in fixing and retaining the limb in proper position in a plaster case for several months. The term 'bloodless' has been applied to this method, since, the skin being unbroken, there is no external hæmorrhage. But the amount of blood shed into the tissues may be limited only by their capacity, and the damage done to delicate structures, nerves, muscles, and blood-vessels is often severe.

Lorenzo Marques. See LOURENÇO MARQUES.

Loreto. (1.) City, prov. Ancona, the Marches, Italy, 14 m. S.E. of Ancona, and about 3 m. from the Adriatic. It owes its origin to a famous chapel of the Virgin, Santa Casa, over which a magnificent church was erected. The shrine is still a famous place of pilgrimage. Pop. (1900) 5,000. (2.) Interior dep., N.E. Peru, S. America, bounded on the N. by Ecuador, and E. by Brazil and Bolivia. It is traversed from N. to S. by the Ucayali and Huallaga, affluents of the Marañon. The department is thickly wooded. The principal exports are rubber and salt. Gold is abundant. Area, 288,456 sq. m. Pop. estimated at 100,000. Its capital is Moyobamba. Pop. (1895) 10,000.

Lorica, or SANTA CRUZ DE LORICA, tn. and seapt., Bolívar, Colombia, S. America, on the Sinú; has active shipping trade. Pop. 7,000.

Lorient, seapt. and fortified naval arsenal, dep. Morbihan, France, on the S. coast of Brittany, at the mouth of Scorff and Blavet R., 63 m. N.W. of St. Nazaire, and with an extensive and well-protected harbour. There is a floating dock for vessels up to 600 tons burden and drawing 15 ft. of water. There are two graving-docks. The dockyard is used for the construction and equipment of men-of-war, and is one of the finest in France. The imports are mainly ship-building materials, iron, and coal; the exports are wheat, wines, sardines. The town was founded in 1670 by the French East India Company, and on the dissolution of the company in 1770 it became a naval station. Pop. (1901) 44,640. Off the port in June 1795 the British under Lord Bridport defeated the French under Villaret-Joyeuse. This victory opened the way for an expedition to Quiberon. Although the action was really fought off Groix, it is commonly known as the action off Lorient; and Groix itself was for a time confused by the naval authorities with Belleisle, another island, the result being that the *Formidable*, which was captured, was renamed *Belleisle* in honour of the occasion.

Lorimer, JAMES (1818-90), Scottish jurist and author, born at Aberdalgie, Perthshire, was educated at the Universities of Edinburgh, Berlin, and Bonn. In 1865 he became professor of public and international law in Edinburgh (1865), and was one of the founders of the Institute of International Law (1873). His work, *Institutes of the Law of Nations*, was published in 1883-4. See notice by Professor Flint in *The Juridical Review* (April 1890).

Lorimer, JOHN HENRY (1856), Scottish painter, born at Edinburgh. He began to exhibit in Edinburgh (1875), and two years later in London. He was elected R.S.A. in 1900. At the Paris Salon he has gained several medals. Among his pictures are *The Ordination of Elders* (now in the Luxembourg), *The Eleventh Hour*, *Lullaby*, and *A Child's Thanksgiving*.

Loriquets are parrots nearly allied to the lories, but differing from them in their smaller size and their elongated and pointed tail feathers. One of the largest is Swainson's loriquet (*Trichoglossus Novae-hollandiae*), which inhabits E. Australia. See LORY.

Loris (probably from Dutch *loeris*, 'a clown'), or SLOW LEMUR, names applied to three Asiatic lemurs remarkable for the exceeding slowness of their movements. The common loris (*Nycticebus tardigradus*) occurs in the Malay region, and is about the size of a cat, with a broad head,



Loris, or Slow Lemur.

a thick, woolly coat, a very short tail, and large eyes; the thumb and great toe are widely separated from the other digits. The animals are purely nocturnal in habit, sleeping during the day rolled up in the form of a ball. A smaller form, somewhat doubtfully distinct, is the Javan loris (*N. javanicus*). In the related slender loris (*Loris gracilis*) of S. India and Ceylon the eyes are exceptionally large, and as the name indicates, the body is more lightly built and the limbs longer. The diet does not differ from that of other lemurs.

Loris-Melikoff, MIKHAIL TARILOVITCH (1825-88), Russian statesman and general, born at Tiflis. He was made a count for his brilliant exploits during the Russo-Turkish war (1877-8). Later he so distinguished himself as governor-general of Kharkov (1879) that he was recalled to St. Petersburg to cope with the Nihilist movement (1880). Alexander II., approving of his conciliatory policy, made him minister of the interior. On the Czar's assassination (1881) he resigned.

Loriti, HEINRICH. See GLAREANUS.

Lörrach, comm., grand-duchy of Baden, Germany, in valley of Wiese, 4½ m. N.E. of Basel. Manufactures cotton, silk, chocolate, and hardware; trades in wine, fruit, and timber. Pop. (1900) 10,347.

Lorraine, or LOTHARINGIA, was a province of France situated on its north-eastern frontier, and included such important towns as Metz and Thionville. It was included in Charles the Great's empire, and on the dissolution of that empire passed through a series of vicissitudes, being subsequently created into a German duchy. From Lorraine came the family of the Guises, and its duke played a prominent anti-French part in the Thirty Years' war (1618-48). During the war of the Polish Succession (1733-5) Lorraine was conquered by French troops, and by the third treaty of Vienna (1738) Lorraine and Bar were given to Stanislaus Leszczyński, the ex-king of Poland, and father-in-law of Louis XV., for his life, to become eventually parts of France. Francis, the Duke of Lorraine, was compensated with Tuscany, shortly afterwards married Maria Theresa, became emperor in 1745, and was the founder of the new Lorraine-Hapsburg line. In 1871, at the close of the Franco-German war, the greater part of Lorraine, including Metz and Thionville, was annexed to Germany. See ALSACE-LORRAINE. See also HASSELL's *Periods of European History* (1901), and LAVISSE et RAMBAUD's *Histoire Générale* (1892).

Lorraine, CLAUDE. See CLAUDE LORRAINE.

Lorris, GUILLAUME DE (c. 1215-c. 1240), French troubadour, was the author of the first part of the celebrated *Roman de la Rose*. The bulk and latter part of the poem, which is very inferior to the work of Lorris, was from the pen of Jean de Meung.

Lory, a name given to certain members of the parrot family Loriidae, which is confined to the Australasian region. The purple-capped lory (*Lorius domicella*) of Ceram and Amboyna is an example. Like its allies, it is a honey-sucker, and has the tongue furnished with a kind of brush. It is about a foot in length, and is gorgeously coloured. The ground colour is scarlet, with a gold throat band; the wings are blue and green, and the head capped with purplish black. It is easily domesticated. See PARROT.

Los Andes, or SANTA ROSA DE LOS ANDES, state of Venezuela, on the northern flank of the cordillera of Mérida. The valleys are fertile, and produce cocoa, coffee, sugar, and, on the higher

slopes, wheat and other cereals. Forests extend up to 10,000 ft., above which are the bleak *paramos*, where only grasses grow. Hot springs are numerous. Area, 14,719 sq. m. Pop. 336,200.

Los Angeles. (1.) City, California, U.S.A., on Los Angeles R., the co. seat of Los Angeles Co., and the second city of the state in population. With a level site and a regular plan, it is a beautiful city, having broad, well-paved streets, and detached houses in ample grounds, covered with semi-tropical vegetation. The surrounding country is devoted to the cultivation of fruits, for which irrigation is necessary. The handling of this fruit is the principal item in the large trade of the city. Pop. (1900) 102,479. (2.) Capital, province Bio-Bio, Central Chile, between Laja and Bio-Bio Rs. Pop. (1896) 7,868.

Los Islands, group of volcanic islands (Factory, Tamara, Ruma), w. coast of Africa, 75 m. N.W. of Freetown. They were occupied by the British in 1826, and ceded to France by the Anglo-French Agreement, 1904. Pop. 1,422.

Losoncz, tn., Hungary, co. Nograd, 111 m. from Budapest; manufactures cloth, glass, and paper. Pop. (1900) 8,952.

Lossiemouth, tn., Elginshire, Scotland, on riv. Lossie, 5 m. N.E. of Elgin. Pop. (1901) 3,904.

Lossing, BENSON JOHN (1813-91), American author, born at Beekman, N.Y., was successively farm-boy, watchmaker, journalist, wood-engraver, artist, and historian. His chief works, illustrated by himself, were *Pictorial Field-book of the Revolution* (1850-52), and *Pictorial History of the Civil War* (1866-9); also *History of New York City* (1884), and *The Empire State* (1887). He likewise wrote biographies of celebrated Americans, and an *Outline History of the Fine Arts* (1840).

Lost Property. Lost property still belongs to the true owner, who may retake possession of it either in the hands of the finder or of some one else to whom it has been sold by the finder. The finder of lost property is entitled to keep it till claimed by the owner; but if he knows who the owner is, or has reasonable grounds for believing that the owner can be found, then if he converts it to his own use, he is guilty of theft. In the common case of finding lost property in the streets, the finder will commit theft if he does not hand the property over to the police. If the police fail to find the owner, they must return the property to the finder, who is entitled as against all but the true owner. At the principal railway stations there are lost property offices, to which

anything found in a railway train is taken. The loser on proving ownership, and paying a small charge, can recover the property. Railway companies have periodical sales by auction of unclaimed goods. See TREASURE TROVE.

Lost Tribes, THE. It is a well-authenticated fact that a considerable proportion of the inhabitants of N. Palestine were carried into captivity during the closing years of the kingdom of Israel. A deportation took place in the reign of Pekah (2 Kings 15:29), and the monuments inform us that no fewer than 27,290 persons were taken to Media and Mesopotamia after the fall of Samaria, 721 B.C. (2 Kings 17:6). The kingdom of Judah was similarly dealt with by Babylon (587 B.C.). But while Scripture narrates the return of the captives of Judah, it is silent regarding the fate of the exiled natives of the northern kingdom, so that the ten tribes comprising it simply disappear from history. Many inquirers have busied themselves with speculations as to what became of the expatriated people. One of the most recent theories is that the 'lost tribes' are none other than the inhabitants of Great Britain and the United States—say the Anglo-Celtic peoples. Though boldly promulgated by both journals and books (see Philo-Israel, *An Inquiry establishing the Identity of the British Nation with the Lost Tribes*, 5th ed., 1899), the theory cannot be said to make progress.

Lostwithiel, munic. bor. and mrkt. tn., on the Fowey, Cornwall, England, 5 m. S.E. of Bodmin; was one of the four Cornish towns empowered to coin and sell tin. Pop. (1901) 1,331.

Lot. (1.) Department, S.W. France, bounded on the N. by Corrèze, on w. by Dordogne, on s. by Aveyron. The surface is very varied. The river Lot, with its tributary the Célé, and the river Dordogne, drain the department to the Gironde. The river valleys are very fertile, yielding wheat, oats, barley, rye, and maize. Tobacco, hemp, and fruits are grown. About six per cent. of the department is under vineyards. The manufactures include flax-spinning, tanning, and the manufacture of coarse cloths. There are three arrondissements—Cahors (cap.), Figeac, and Gourdon. Area, 2,018 sq. m. Pop. (1901) 226,720. (2.) River, France, rises in the mountains of Lozère, and flows w. through the departments of Lozère, Aveyron, Lot, and Lot-et-Garonne, and falls into the Garonne at Aiguillon. Length, about 300 m., of which 194 are navigable.

Lot, a character of Hebrew patriarchal times, the grandson

of Terah, and the nephew of Abraham, with whom his history is largely connected. The two left Haran together, proceeded to Canaan, journeyed to Egypt, returned, and afterwards separated, Lot choosing a settlement near Sodom. While living there Lot was captured by the four kings, but was rescued by Abraham (Gen. 14). Being forewarned of the imminent destruction of Sodom, he escaped with his family—his wife, however, being turned into a pillar of salt as the penalty of looking back. Lot was regarded as the ancestor of the Moabites and Ammonites (Gen. 19).

Lot-et-Garonne, dep. S.W. France, is bounded on the N. by Dordogne, on s. by Gers, on w. by Gironde, and on the E. by Tarn-et-Garonne. The department is traversed from S.E. to N.W. by the Garonne, and from E. to w. by the Lot, a tributary of the Garonne. The department is formed mainly of parts of Guienne and Gascony, and is very fertile. The soil is highly cultivated, and grapes, wheat, maize, barley, potatoes, tobacco, hemp, and plums are grown. Iron deposits are numerous. There are four arrondissements—Agen (cap.), Marmande, Nérac, and Villeneuve-sur-Lot. Area, 2,078 sq. m. Pop. (1901) 278,740.

Lothaire I. (795-855), emperor of the Holy Roman empire, eldest son of Louis the Pious, on whose death (840) he claimed the title. Though opposed and defeated at Fontenay (841) by his brothers, the treaty of Verdun (843) secured to him Italy and some provinces of France. He gave his name to Lotharinga (Lorraine).

Lothaire II., THE SAXON (1075-1137), emperor of the Holy Roman empire, became duke of Saxony through his wife, and king of Germany by election. See Bryce's *Holy Roman Empire*.

Lothians, THE, dist. of Scotland, includes the counties of Haddington, Edinburgh, and Linlithgow, named respectively East, Mid, and West Lothian. From 547 to 1018 the district formed part of the kingdom of Northumbria.

Loti, PIERRE, pseudonym of LOUIS MARIE JULIEN VIAUD (1850), French novelist, born at Rochefort; entered the French navy (1867), and became lieutenant (1881). In 1879 he produced his first tale, *Aziyadé*, a story of the Bosphorus; and in rapid succession followed *Le Mariage de Loti* (1880); *Le Roman d'un Spahi* (1881), a powerful study of a soldier in Africa; *Mon Frère Yves* (1883); *Le Pêcheur d'Islande* (1886), the most popular of his books; *Madame Chrysanthe* (1887);

Propos d'Exil (1887); *Japonneries d'Automne* (1889); *Le Roman d'un Enfant* (1890); *Le Livre de la Pitié et de la Mort* (1891); *Fantôme d'Orient* (1892); *Le Désert* (1894); *La Galilée* (1895); *Ramuntcho* (1897); *L'Inde sous les Anglais* (1903). Pierre Loti's popularity was swift and assured. His books are lacking in much that goes to make up a plot, but as an impressionist he is eminently successful. His language is wholly unstudied. Pierre Loti was admitted to the French Academy in 1891.

Lotions are aqueous solutions of medicinal substances. Many are in use, but for their specific definitions the British Pharmacopœia must be consulted.

Lotophagi, or **LOTUS-EATERS**, in ancient Greek legend, a people met with by Odysseus in his wanderings. They ate the fruit and drank the juice of a plant which had the property of causing a man to lose all desire to return to his own land. In historical times the Greeks became acquainted with tribes on the north coast of Africa, near the Syrtis Minor, whose chief food was a plant which they called the lotus; and they therefore placed the Lotophagi of the *Odyssey* on that coast. See Homer's *Odyssey*, Herodotus, and Polybius; also Tennyson's *Lotus-eaters*.

LOTS, CASTING, a mode of divination practised by many ancient peoples. It was used extensively among the Hebrews, though we do not know the means employed, and was regarded as a legitimate mode of ascertaining the Divine will (cf. Prov. 16:33—'The lot is cast into the lap; but the whole disposing thereof is of the Lord'). Thus, it was used to discover a criminal—e.g. Achan (Josh. 7:14), Jonah (1:7); or the right man for an office—e.g. Saul (1 Sam. 10:20 ff.), Matthias (Acts 1:26). The division of territory among the tribes was also determined by casting lots (Num. 33:54), whence the use of the term lot to indicate a possession, both literally and figuratively (Josh. 15:1; Ps. 16:5); likewise the choice between the goat offered to Jehovah and the so-called scapegoat. See AZAZEL, URIM AND THUMMIM, and Benzinger's *Hebräische Archäologie*.

Lottery. A lottery, or 'a distribution of prizes by lot or chance,' although at one time permissible, is now rendered illegal by a great number of acts from 1698 onwards, the most important of them being the Gaming Act, 1802, which constitutes the sale of tickets for a lottery in Great Britain or a foreign country as an illegal transaction. Both those who keep lotteries and those who

subscribe to them are liable to penalties, the former being also liable to conviction as 'rogues and vagabonds.' The distribution of prizes must depend upon chance; for if there is a real element of skill imported into the transaction, it is not a lottery. So, where a newspaper offered to its readers a prize for a correct prediction of the number of births and deaths in London during a specified future week, the offer was held not to constitute a lottery within the Lottery Acts. It is immaterial whether the lottery is of a public or private character, or whether its object is purely charitable or otherwise. Thus, a club sweepstake and a church raffle are both illegal, as being contrary to the Lottery Acts. The so-called 'missing word' competitions have also been held to be illegal. See also ART UNION.

LOTTO, LORENZO (c. 1480-c. 1556), Italian painter, born at Venice. Among his paintings, which are practically all concerned with religious subjects, are the *Betrothal of St. Catherine*, now at Munich; *Christ's Farewell to his Mother*, in the museum at Berlin; and a *Holy Family*, in the Uffizi Gallery at Florence. See Eberenson's *Lorenzo Lotto* (1895).

Lotus, a genus of plants of wide geographical distribution, order Leguminosæ. Most of the species have four or five foliate leaves, and produce their flowers in umbels or axillary peduncles. The calyx has usually five equal teeth, and the fruit is a many-seeded cylindrical legume. The two common British species are *L. major* (the greater bird's-foot trefoil) and *L. corniculatus* (the common bird's-foot trefoil), both with brilliant yellow flowers in umbels, and common meadow plants. Among the garden species are *L. australis*, a greenhouse pink-flowering plant about two feet in height; *L. jacobæus*, also a greenhouse plant, from the Cape Verde Is., bearing dark purple flowers; and *L. peltorhynchus*, a greenhouse shrub, with scarlet flowers.

LOTZE, RUDOLF HERMANN (1817-81), whose name is perhaps the most important in philosophy since Hegel, was born at Bautzen in Saxony; educated at the Gynnasium in Zittau and the University of Leipzig, his course of studies including medicine as well as philosophy. He was appointed to a professorship at Leipzig (1842), then called to Göttingen (1844) as successor to Herbart, which post he left (1881) to occupy a similar chair in Berlin, where he died soon after entering upon his duties. On the subjects to which his studies were mainly devoted—medicine or biology and philos-

ophy—he wrote largely. The great problem which lies on the border line between them, that of the relations of body and mind, forms the theme of his best-known work on the former subject, his *Medizinische Psychologie* (1852). His chief philosophical writings are of later date. The most comprehensive of them is the *Mikrokosmos* (1856-64), in which his whole system of thought was set forth in a more popular form than that of his academic treatises. He began a more formal exposition of his 'system of philosophy' with a work on *Logik* (1874), followed by a second work on *Metaphysik* (1879). The third part, which was to have dealt with ethics, æsthetics, and philosophy of religion, was never finished. He also wrote for a series of histories of the sciences a volume entitled *Geschichte der Ästhetik in Deutschland* (1868), in which his views on art are embodied.

In philosophy Lotze represents a reaction against the speculative movement which culminated in Hegel. One of Lotze's favourite themes was the mechanical view of nature. But his insistence on the mechanical aspect of things did not prevent him from recognizing that mechanism is only the means by which the higher ends of spiritual existence and activity are realized. His philosophy was a reaction against the unduly abstract and logical character of Hegelian idealism, which seemed to sacrifice all the warmth of individual life and feeling, all the peculiar value of concrete processes and things, to the rigid and formal evolution of a great conceptual scheme. Lotze insists on the worth of personality, on the place of feeling, or, in general, on the superiority of content to mere form. An excellent short account of Lotze is contained in a paper in Wallace's *Lectures and Essays on Natural Theology* (1898); Jones's *Philosophy of Lotze* (1895) is the first part of an academic criticism. See also Hartmann's *Lotze's Philosophie* (1888), and Vorbradt's *Prinzipien der Ethik und Religionsphilosophie Lotzes* (1891).

Loubet, EMILE (1838), president of the French republic, born in the village of Marsanne; studied as a lawyer in Paris, and joined the bar at Montélimar, of which town he was elected mayor (1870). He was returned to the Chamber of Deputies as member for Montélimar (1876); joined the Tirard cabinet as minister for public works (1887); and entered the Senate (1885), of which he was chosen president (1895), and again in 1898. In the interval he had been chairman of the finance committee in the Senate (1890), prime minister (1892), and chair-

man of the customs committee (1893). In 1899 he was elected president of the French republic, in succession to M. Faure. Several events of great international importance have distinguished his tenure of this high office. He received the Czar of Russia in Paris, and journeyed to St. Petersburg to return the visit. In June 1903 he entertained King Edward VII., who, a month later, welcomed M. Loubet in London—the first occasion on which the head of the French state had visited London

Loudon, JOHN CLAUDIUS (1783–1843), Scottish landscape gardener and horticultural writer, born at Cambuslang in Lanarkshire. He made a thorough study of various methods of agriculture and horticulture, British and European, and embodied the results in the *Encyclopædia of Gardening* (1822), *Encyclopædia of Agriculture* (1825), and *Encyclopædia of Plants* (1829). Loudon's chief work, the *Arboretum et Fruticetum Britannicum*, was a financial failure, involving him in heavy

Loughrea, mkt. tn., Co. Galway, Ireland, 10 m. S.E. of Ath-enry; has the ruins of a 14th-century castle and a Carmelite friary founded by Richard de Burgh. Pop. (1901) 2,557.

Louis. See **LUDWIG**.

Louis IX. (1215–70), king of France, better known as Saint Louis, may be regarded as the highest type of ruler produced by the Roman Catholic and feudal world of the middle ages. Despite his sincere Catholicism, he showed no subservience to the papacy. Under him the administrative and judicial systems of France were developed. All his legislation shows remarkable humanity. The only part of his rule that can be charged with weakness is his readiness to enter on the crusading movement. He attacked Egypt (1248), but was defeated at Mansourah and taken prisoner (1250). He again sailed (1270), this time for Tunis, but died of plague immediately on landing. See Joinville's *Histoire de Saint Louis* (1874), and Perry's *Saint Louis* (1901).

Louis XI. (1423–83), king of France, the eldest son of Charles VII., was born at Bourges. He raised France from the degradation of the Hundred Years' war, and gave to the government the unity and vigour that the times required. His chief enemies were the feudal nobles in alliance with Charles the Bold, Duke of Burgundy. In this struggle he suffered some severe disasters, and in 1467 was actually a prisoner in the hands of Charles at Péronne. In his internal administration he made great use of the new ideas of Roman law which were fast coming into vogue. He has been called the first of modern statesmen, and may be compared to his younger contemporary, Henry VII. of England. See Michelet's *Louis XI. et Charles le Téméraire* (1853), Legeay's *Histoire de Louis XI.* (1874), and Wilt's *The Reign of Louis XI.* (1876).

Louis XIII. (1601–43), king of France, son of Henry IV., born at Fontainebleau; ascended the throne at the age of nine. His reign was at first completely dominated by his mother, Marie de' Medici; and when she was pushed aside, he was again the apparently passive instrument of Richelieu's policy. Richelieu became minister (1624), and thenceforward ruled France with almost absolute sway. (See **RICHELIEU** and **FRANCE**.) The general lines of Richelieu's policy were doubtless approved by the king. If Louis XIII. had not given a general approval to these objects, Richelieu could not have pursued them; but it is impossible to trace his personal influence on the policy of France. Richelieu's



Emile Loubet, President (1899–1906) of the French Republic.

(Photo by Pierre Petit, Paris.)

for nearly half a century. Later in the year the king of Italy was the guest of the president in Paris. King Edward again visited him in April 1905, and the king of Spain in May–June of the same year. The president made state visits to Madrid and Lisbon in October 1905. M. Loubet has succeeded in bringing about a more friendly feeling between France and Britain than has existed for several generations.

Loudon, GIDEON ERNEST. See **LAUDON**.

debt. See Life prefaced to his *Self-Instruction for Gardeners* (1844).

Loughborough, munic. bor. in Leicestershire, England, on l. bk. of the Soar, 12 m. N.N.W. of Leicester. Manufactures hosiery, locomotives, machinery, tramcars, and electric plant. The church of All Saints has a fine 16th-century tower. Pop. (1901) 21,508. See Dimock Fletcher's *Historical Handbook to Loughborough* (1881), and his *Parish Register of Loughborough* (1873).

policy was opposed by every member of the royal family except the king. On several occasions it was believed that the king would be forced to abandon his minister. The two most critical occasions were November 1630 and in 1642. The first is known as the 'Day of Dupes.' The queen induced the king to dismiss some of Richelieu's agents, and it was believed that the cardinal minister must himself fall. But he recovered his ascendancy, and the queen-mother and his brother, Gaston of Orleans, had to fly from France. On the second occasion the king was much influenced by two young courtiers, De Thou and Cinq-Mars. Richelieu, however, discovered their treasonable intrigues with Spain, and had them executed. The king declared once more his complete confidence in his great minister, but both died soon afterwards. See Malingre's *Histoire de Louis XIII.* (1646), Bazin's *Histoire de France sous Louis XIII.* (1837), Zeller's *Etudes critiques sur le Règne de Louis XIII.* (1879-80); and Perkins's *Richelieu and the Growth of French Power* (1900).

Louis XIV. (1638-1715), king of France—the 'Grand Monarch,' as he was almost officially called—was the late-born son of Louis XIII. His reign saw the splendour and strength of the French monarchy reach and pass its zenith. It falls naturally into three periods: (1) From his accession (1643) to the death of Mazarin (1661)—during this period he reigned but did not rule; (2) from 1661 to 1685—this was the period of his greatest prestige and power, both at home and abroad; (3) from 1685 to his death (1715)—the political and military situation became decidedly unfavourable to France, and the king's popularity was much diminished. (1.) During the first period of his reign France was really governed by his mother, Anne of Austria, and the Italian Cardinal Mazarin, to whom she was probably married. (2.) On the death of Mazarin (1661) Louis XIV. assumed the reins of government. The first years of his personal rule were occupied in an attempt—presided over by Colbert—to improve the financial system of France, and to foster the growth of industry by an elaborate protective system. Then France became involved in a long series of wars. Those falling within the second period are the war of devolution (1667) and the war against Holland (1672-8). During all these years the court of Louis XIV. was brilliant in the extreme. The literary glory of France was at its height, and the king's protection of Molière deserves especial men-

tion. (3.) The third period (1685-1715) is marked at home by the growing pietism of the king under the influence of his second wife, Madame de Maintenon, and by the persecution of the Huguenots and the Jansenists. The withdrawal of protection from the Protestants of France by the revocation of the Edict of Nantes (1685) was the worst blunder as well as the greatest crime of the reign. See Voltaire's *Siècle de Louis XIV.* (1751), James's *The Life and Times of Louis XIV.* (1838), Chotard's *Louis XIV.* (1890), Saint-Amand's *La Cour de Louis XIV.* (Eng. trans. 1894), Hassall's *Louis XIV. and the Zenith of the French Monarchy* (1895), Pardoe's *Louis the Fourteenth* (1902), and Haggard's *Louis XIV. in Court and Camp* (1904).

Louis XV. (1710-74), king of France, the great-grandson of his predecessor, Louis XIV., was brought to the throne by a series of deaths in the royal family which were by lying rumour attributed to the Duke of Orleans, who became regent. After the death of Orleans the chief minister was Fleury, and he ruled France in the king's name down to his death, in 1743.

Louis XV., except during a few years after his majority, was indolent, sensual, and suspicious, without any sense of duty or talent for affairs. He was ruled by his mistresses, of whom the most famous were Madame de Pompadour and Madame du Barry. His court was more immoral than that of Louis XIV., and was not redeemed by wit, or dignity, or grace. Abroad, France engaged in two great wars. The war of the Austrian Succession (1741-8) brought some striking successes to the French arms; but in the Seven Years' war (1756-63) which followed, France was crushingly defeated by Frederick the Great, and lost to England both Canada and India. At home, meanwhile, a vigorous opposition was rising up. The Parliament of Paris resisted the taxation edicts of the king; the church suffered a severe blow in the suppression of the Jesuit order (1764); the whole tone of literature was becoming revolutionary, and the corruption and extravagance of the reign did much to provoke the great outbreak of the revolution. See Voltaire's *Histoire du Siècle de Louis XV.* (1768-70), Carlyle's *French Revolution* (1837), Carré's *La France sur Louis XV.* (1891), Saint-Amand's *La Cour de Louis XV.* (1894; Eng. trans.), and Perkins's *France under Louis XV.* (1897).

Louis XVI. (1754-93), king of France, the grandson of Louis XV., was left with the terrible legacy of Louis XV.'s misgovern-

ment. His first act was to appoint a reforming ministry, containing Malesherbes and the great Turgot. For less than two years Turgot was allowed to work at his scheme of reforms, the adoption of which might have averted the revolution; but he was overthrown through the opposition of the queen, Marie Antoinette. Turgot was succeeded by Necker, Calonne, and Loménie de Brienne; but no further attempts at a thorough-going reformation of the system of government were made. The situation was further complicated by the outbreak of the war with England on behalf of the colonies of N. America (1778). The war was a very glorious one for France, and it was very largely her assistance that gained for America independence in 1783. But the expenses of the war still further ruined the finances of France, and the republican example of America proved contagious. The king played no very important part in the events that preceded the revolution, but it was largely on his own responsibility that Necker was recalled (1788) and the States-General summoned.

Louis XVI. was weak of will, and constantly under the influence of his wife or his brother. His policy was consequently vacillating and fatal. In October 1789 he was compelled to leave Versailles and take up his residence in Paris, and was thenceforward a prisoner in the hands of the revolutionists. The king and queen escaped from the palace (June 1791), and tried to join the army on the frontier; but they were caught at Varennes, and were brought back to Paris. In September 1791 he accepted the new constitution; but the ardent revolutionists believed that the deposition of the king was the only road to national salvation. On Aug. 10, 1792, the palace of the Tuileries was attacked, and the king forced to take refuge with the Assembly. The monarchy was immediately afterwards suspended, and the convention was called together. The abolition of the monarchy was not deemed sufficient. The king was brought to trial, found guilty of a conspiracy against the nation, and guillotined on Jan. 21, 1793. See Droz's *Histoire du Règne de Louis XVI.* (1839-42); Thiers's *Histoire de la Révolution Française* (1824-27); Jobez's *La France sous Louis XVI.* (1877-93); Nicolardot's *Journal de Louis XVI.* (1873); Somiaud's *Louis XVI. et la Révolution* (1893).

Louis XVII. (LOUIS CHARLES) (1785-95), titular king of France, was the second son of Louis XVI. He never reigned, and died when the reign of terror was at its height, a prisoner in the Temple.

The obscurity of his fate allowed various impostors to lay claim to his inheritance; but though some of them still have their strong supporters, the facts of his death seem beyond doubt. See Stevens's *The Lost Dauphin* (1887), Evans's *The Story of Louis XVII.* (1893), and Weldon's *Louis XVII. of France* (1895).

Louis XVIII. (1755-1824), king of France, brother of Louis XVI., had played during the early part of his brother's reign an obscure rôle in resisting the reforming measures of Turgot and Calonne. Upon the outbreak of the revolution he managed to reach Brussels, and passed the years down to 1814 in exile. But in 1807, after the treaty of Tilsit, he took refuge in England; and in 1814, when Napoleon was sent to Elba, he was proclaimed king, and entered Paris. His reactionary measures did much to prepare the way for Napoleon's last attempt. He was restored to the throne after Waterloo, and his government at first engaged in reactionary and repressive measures. But the obvious discontent of France made a change necessary, and for some years Louis XVIII. vacillated between the two opposing parties. See De Beauchamp's *Vie de Louis XVIII.* (1825), and Saint-Amand's *La Cour de Louis XVIII.* (1891).

Louis, Sir Thomas (1759-1807), British admiral, served in Keppel's action off Ushant (1778), in the first battle off Cape St. Vincent (1780), and commanded the *Minotaur* (74 guns) at the battle of the Nile (1798). For his services as second in command under Duckworth at San Domingo (1806) he was made a baronet. In 1807 he took part in the operations in the Dardanelles, but died three months later on board his flagship *Canopus*, off Alexandria.

Louisburg, tn., Atlantic coast, Cape Breton I., Brit. N. America. It commands the entrance to the Gulf of St. Lawrence. While the island of Cape Breton remained French, it was an important seaport and fortress, but is now little more than a fishing village. Wolfe took the town and fort before he advanced to the capture of Quebec (1758). In 1904 a memorial fund was started to preserve the remains of the fortress, and to commemorate those who fell in the siege. It has a magnificent harbour, which is never frozen over, and is utilized for the winter export of coal. Pop. 1,116. See *Louisbourg in 1745* (Eng. trans. by Professor Wrong), and Bourinot's *Memorials of the Island of Cape Breton* (1892).

Louis-d'Or, a French gold coin, first struck by Louis XIII. (1640), and used continuously till 1795. Its value varied from 10 francs (1640) to 24 francs (1787).

Louise, QUEEN OF PRUSSIA. See LOUISE.

Louise, CAROLINE ALBERTA, PRINCESS (1848), Duchess of Argyll, the fourth daughter of Queen Victoria, married (1871) the Marquis of Lorne, now ninth Duke of Argyll. Princess Louise is a member of the Royal Society of Water-Colour Painters, and is also a talented sculptor, her chief work being the statue of Queen Victoria in Kensington Gardens.



Princess Louise, Duchess of Argyll.

(Photo by H. S. Mendelssohn.)

Louisiade Archipelago, group of islands, Oceania, at the southeastern extremity of British New Guinea. The largest islands of the group are St. Aignan and Southeast. Alluvial gold has been found, but reef-mining has not been developed to any extent. The islands were discovered by Torres in 1606, and taken by the British in 1888. The inhabitants are of Papuan and Malayan type.

Louisiana. (1.) One of the southern states of the United States of America, bordering on the Gulf of Mexico, with an area of 48,720 sq. m. It was admitted to the union as a state (1812), having been formed from the Louisiana territory purchased from France (1803). The surface is low, rarely exceeding 300 ft. above sea-level in the highest northern part, and gradually descending to sea-level. Much of its area consists of alluvial and marsh lands, lying along Red R. and the Mississippi, with its distributaries (locally called 'bayous'), while the coast is bordered by a broad strip of marsh. Except where cleared for cultivation, the state is covered with forests, consisting mainly of

pine on the uplands and cypress in the swamps. The capital is Baton Rouge (pop. 11,269), and the chief city and port is New Orleans (pop. 287,104). Farming is the leading industry of the state. The cultivated area (1900) was sixteen per cent. of the total area of the state. The principal crops are cotton, Indian corn, sugar (in the S.E. of the state), and rice. The manufactures of Louisiana are largely concentrated in the city of New Orleans. Chief products: refined sugar, lumber, and cotton-seed oil, and cake. There are 2,800 miles of railway. Pop. (1900) 1,331,625, 47 per cent. being negroes. (2.) City, Pike co., Missouri, U.S.A., on the Mississippi, in a fine fruit and lumber region, 114 m. N.W. of St. Louis. Pop. (1900) 5,131. (Map, p. 3888.)

Louis Philippe (1773-1850), king of the French, the son of Philippe 'Egalité,' who was executed during the revolution (1793), was born in the Palais Royal, Paris. As colonel in the revolutionary army he fought at Valmy and Jemappes. But in 1793 he left the army, and visited England and the United States. He returned to France in 1814, and under Louis XVIII. and Charles X. was regarded as the leader of the Liberal party. Upon the abdication of Charles X. he was made lieutenant-general of the kingdom, and a week later the two Chambers declared him 'king of the French.' He took the oath to the new charter, and prepared to govern on liberal lines. But in 1835, after the dangerous attempt of Fieschi on his life, the laws of September were passed, controlling the press and the methods of political trials. In 1836 Louis Napoleon tried to stir up a rising among the troops at Strassburg, but failed, and was sent to America, whence he made his way to England. In 1840 he landed at Boulogne, and made an unsuccessful attempt to organize an insurrection; on his capture he was condemned to imprisonment for life. In the same year the remains of Napoleon were brought from St. Helena, and were buried in Paris amidst great enthusiasm. The revival of the imperial tradition was a heavy blow against the stability of Louis Philippe's essentially commercial and bourgeois régime. In 1843 the radical socialist party was founded by Louis Blanc, and thus the government of Louis Philippe was attacked from two sides. The *entente cordiale* between Britain and France, ratified by the visit of Queen Victoria and the prince consort to Paris, was the king's chief support. In 1847 the extension of the franchise was demanded from many sides, and in



Louis XIV, and Molière. By Vetter. In Luxembourg Palace.

1848 the long-prepared forces broke out into revolution. Guizot, the chief minister, resigned. Thiers refused to form a ministry, except on the understanding that reform would be granted. The king thereupon abdicated and fled to England. See Wright's *The Life and Times of Louis Philippe* (1841), Dumas's *Histoire de la Vie Politique et Privée de Louis Philippe* (1852), and Rouvion's *Histoire du Règne de Louis Philippe* (1861).

Louisville, largest city of Kentucky, U.S.A., and the co. seat of Jefferson co., on the Ohio, at the falls. It is one of the greatest railway centres s. of the

Lourdes, tn., dep. Hautes-Pyrénées, France, on the r. bk. of Gave de Pau, 90 m. s.e. of Bayonne; is one of the chief places of Catholic pilgrimage. Its fame dates from 1858, when the Virgin Mary is reported to have appeared to a girl of thirteen, Bernadette Soubirous. The famous spring rising from the spot is credited with miraculous powers, and a church was built in 1889 for the accommodation of pilgrims, of whom about 500,000 visit the place annually. Pop. (1901) 8,708. See the *Annales de Lourdes*, Zola's *Lourdes* (1894), and Gué's *Histoire de Notre Dame de Lourdes* (1896).

connects Lourenço Marques with the Transvaal system. An outlet to bar gold from Johannesburg, Lourenço Marques is also being utilized as a coaling port. Imports (1904), £1,169,730; exports, £117,673; transit trade, £3,210,410. Pop. (1903) 6,370, of whom 3,319 were whites.

Louse. See LICE.

Lousewort. See PEDICULARIS.

Louth. (1.) Maritime co., Leinster, the smallest in Ireland, lying between Carlingford Lough and the mouth of the Boyne. The surface is low and undulating in the south and the centre, and mountainous on the border of Carlingford Lough. The rivers



Ohio R., and an important river port. The falls here are avoided by a lock. The immense water-power furnished by the falls makes Louisville one of the great manufacturing cities of the south. It is the largest manufacturer and exporter of tobacco in the world. The principal products besides tobacco are packed meats, cotton-seed oil and cake. Louisville was founded in 1780, and named in honour of Louis XVI. of France. Pop. (1900) 204,731.

Loulé, tn., dist. Faro, Portugal, 10 m. N.W. of Faro; trades in palms and esparto grass, and manufactures porcelain and leather. There are copper mines in the vicinity. Pop. (1900) 22,511.

Louping-ill. See SHEEP-Diseases of.

Lourenço or Lorenzo Marques. (1.) Most southerly of the three districts of Portuguese E. Africa. Watered by the Lundé and Limpopo, it comprises five sub-districts, including the rich gold-yielding territory of Manica. (2.) Capital of above district, at the mouth of the Espírito Santo, or English R., in the N.W. of Delagoa Bay; was founded (1544) as a Portuguese factory. A railway runs 57 m. within the colony, and thence 290 m. of line to Pretoria, giving a railway route to Johannesburg 80 m. shorter than that from Durban. An agreement (1901) regulates the commercial relations and the transit of goods by this railway between the Portuguese and the British possessions. A telegraph line

include Boyne (on s. border), Dee, Glyde, and others flowing to the Irish Sea. Agriculture is the principal employment; Carlingford Bay is famous for oysters; and linen is manufactured. The county comprises six baronies, and returns two members to Parliament. Dundalk is the county town. Area, 316 sq. m. Pop. (1901) 65,820. (2.) Town, Lindsey division, Lincolnshire, England, 15 m. E.S.E. of Grimsby. St. James's Church was founded in the 12th century. The town is chiefly an agricultural centre, with iron-founding, manufacture of agricultural implements, and other industries. The Louth navigation canal (constructed 18th century) connects with the Humber. Area, 2,651 ac. Pop. (1901) 9,518.

Louvain, or **LÖWEN**, tn., Belgium, prov. Brabant, 18 m. E. by N. of Brussels. It is famous for its university, founded in 1426, now attended by some 1,600 students. Manufactures beer, lace, starch, and tobacco. Its town hall (one of the finest on the Continent) and the church of St. Gertrude, both of the 15th century, are the chief features of the town. Pop. (1900) 42,070. See Van der Linden's *Histoire de Louvain* (1892).

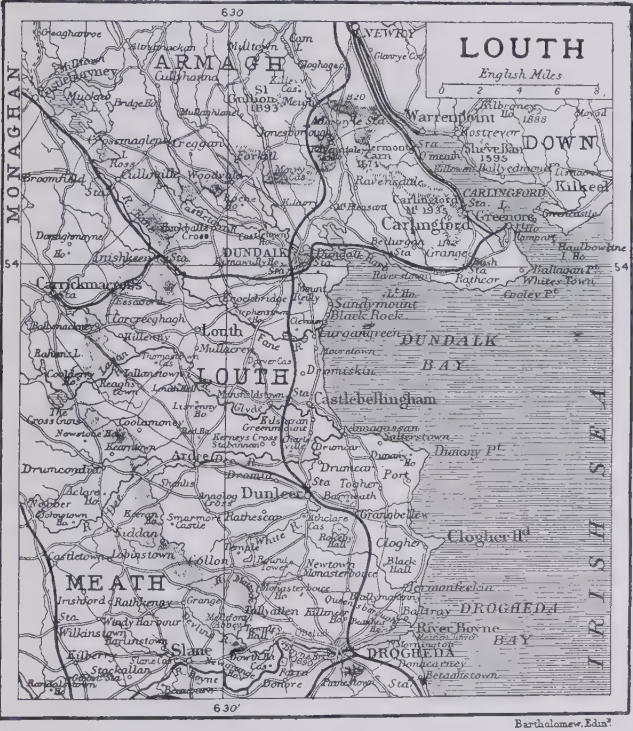
Louviers, tn., dep. Eure, France, on riv. Eure, 17 m. S.E. of Rouen; has a very fine Gothic cathedral dating from the 13th

are now generally used for ventilation, and overlapping sloping boards are so fixed in the opening that air is admitted between them and rain excluded. Similarly, in a belfry, louvre-boards serve to direct the sound downwards.

Louvre, THE, a magnificent pile of buildings facing the Seine in Paris; formerly a royal palace, now a museum of art treasures, has been known under its present name since the time of Philippe-Auguste (1204). Succeeding kings of France made additions and reconstructions. Two of the existing façades were the work of

jects of art in the world. On the ground floor is to be seen the famous Venus of Milo (discovered 1820), the Pallas of Velletri, and other priceless statues. In the Salon Carré are masterpieces of painting by Raphael, Titian, Leonardo da Vinci, Giorgione, Correggio, Paul Veronese, Tintoretto, Rubens, and others. Next to the French school, the Italian is best represented; but there are examples of most of the great artists of Europe in the galleries, and of late years a considerable number of works by British artists have been acquired. See Potter's *The Art of the Louvre* (1904).

Lovage (*Ligusticum scoticum*) is a perennial herbaceous plant, order Umbelliferae, and native to Britain. It bears pinkish-white flowers in umbels of many rays and pinnately-divided leaves.



Lovage (*Ligusticum scoticum*).
1, Flower; 2, fruit; 3, section of half fruit.

century. Manufactures cloth, machinery, and leather. Pop. (1901) 10,219.

Louvois, FRANÇOIS MICHEL LE TELLIER, MARQUIS DE (1641-91), war minister under Louis XIV., was the first to organize a standing army for France. He set on foot systems of commissariat and hospitals, and established the Hôtel des Invalides in Paris (1674). See Rousset's *L'Histoire de Louvois* (1862-3).

Louvre, or LOUVER (Fr. *Pouvert*, 'the opening'), an ornamental outlet for smoke on the roof of a building, usually in the shape of a turret or a lantern. Louvres

Pierre Lescot, the architect of Francis I., while the eastern wing was designed by Claude Perrault for Louis XIV. The revolution of 1789 found the palace still unfinished, the republican government (1793) converting it into a national museum, while Napoleon continued their work of reconstruction. Not till after the revolution of 1848 was the building completed and connected with the Tuileries. In 1900 two new galleries were added, and it is now the most extensive museum in Europe, containing the richest collection of pictures, statues, antiquities, gems, and other ob-

Lovat, SIMON FRASER, TWELFTH LORD (?1667-1747), Scottish Jacobite intriguer, was descended from a Peeblesshire family, one of whom obtained the fort of Lovat, Inverness-shire. By the will of his cousin, the tenth Lord Lovat (who died in 1696), the Lovat estates were made over to Fraser—his father, who had a life rent of them, assuming the title of Lord Lovat, and Fraser himself that of Master of Lovat. As Emilia, daughter of the tenth lord by Lady Amelia Murray, only daughter of the first Marquis of Atholl, claimed the honours, Fraser planned to carry her off and marry her; and failing accidentally in this, he seized instead her mother, whom he compelled to submit to a marriage



The Louvre.

1. The Louvre from the Place du Carrousel. 2. Gallery of Paintings. (Photo by Frith.) 3. Gallery of the Venus of Milo. (Photo by Frith.) 4. Gallery of Apollo.

ceremony. For this he and his father were condemned to be executed (1698), but they eluded capture; and in 1700, Fraser, who now, his father being dead, claimed to be Lord Lovat, endeavoured to secure a pardon from King William. He obtained indemnity for his political offences, but for his outrage on the Dowager Lady Lovat he was outlawed (Feb. 17, 1701). Compelled to flee to France, he there endeavoured to win the confidence of the Jacobites by becoming a convert to Catholicism. At the request of the clan he resolved to return home (1713). Though arrested in London, he was liberated on heavy bail, and, by siding with the government in the '15, secured full pardon and also the life rent of his estates. In 1730 his claims to the Lovat dignities and honours were sanctioned by the Court of Session; and in 1733, Mackenzie, the husband of the Lovat heiress, resigned his claims to the honours and estates for a sum of money. Becoming incautious in his intrigues with the Jacobites, he was deprived by the government of all his official dignities. Vengeance, therefore, made him eager for the success of the 'Young Chevalier' in 1745. After Culloden he sought concealment, but was taken prisoner, brought to London, and after a trial by his peers condemned and beheaded on Tower Hill. See *Lovat's Memoirs* (1797), Hill Burton's *Life of Simon, Lord Lovat* (1847), Fraser's *Chiefs of Grant* (1833), and *Major Fraser's Manuscript* (edit. by Fergusson, 1888).

LOVAT, SIMON JOSEPH FRASER, SIXTEENTH BARON (1871), Scottish soldier, was a lieutenant in the 1st Life Guards from 1893 to 1897. In the early stages of the Boer war (1899-1902) the War Office accepted his offer to raise a corps of scouts, composed of Scottish gillies, for service in S. Africa, designated 'Lovat's Scouts,' with Lord Lovat in command. They remained in the field until the close of the war, and their services were favourably reported upon both by Earl Roberts and Viscount Kitchener. Lord Lovat was mentioned in dispatches, and received the D.S.O. (1900) and was made a C.B. (1902) for his services, and subsequently a C.V.O. Lovat's Scouts now form the 55th company of the Imperial Yeomanry.

Love. The emotion enters into various states, either as an element or as the substance—parental love, fraternal love, the love of the sexes, benevolence, pity, gratitude, sorrow, admiration, esteem, æsthetic emotion, religious emotion, and many varieties of these. Tender emotion

may extend to the animal world, and in a strict sense may have significance for the inanimate, as in the love of particular places, countries, homes, etc. Love in its most characteristic forms is the concentration of tender feeling on a person and in the love of the sexes. Of the emotion as a mental state, distinguishable elements are: desire for presence of the person loved, and pleasure in such presence; depression at parting; longing for and focusing of whole imagination on the memory of the absent one. In the case of maternal love most of these features are pronounced; in love of the sexes they normally accompany the establishment of sexual maturity. This is the period of ideals, and is characterized by an enormous expansion of emotional and intellectual interests. The mating instinct becomes active. Maternal and paternal love are natural sequels of the mating instinct. The expression of tender feeling in all its forms involves, in varying degrees, the whole vasomotor system, in particular the lachrymal glands, tears being associated both with joy and sorrow. From the evolution standpoint, the tender emotion accords generally with Darwin's theory. (See **EMOTIONS**.) All the emotional preliminaries of mating—love and courtship—have analogues in the lower animal world, and it is easy to assign selection value to most of them; but the full explanation of love for one only person is yet to seek. The concrete psychology of love is best studied in the great poets and novelists of all nations. As indicating phases and varieties, the following are typical artistic expressions: Shelley, *The Indian Serenade*; Landor, *Rose Aylmer*; Milton, *Lycidas*; Tennyson, *In Memoriam* and *Locksley Hall*; Swinburne, *Triumph of Time*; Meredith, *Modern Love*; Keats, *The Eve of St. Agnes*; Shakespeare, *Romeo and Juliet*. See Bain's *The Emotions and the Will* (1859), and *Mental and Moral Science* (1868); Höffding's *Die Psychologie in Umrissen* (1892); Mercier's *Sanity and Insanity* (1890); Krafft-Ebing's *Psychopathia Sexualis* (new Eng. trans. 1899); and Darwin's *Descent of Man* (1871).

Love-bird, a name applied to small parrots belonging to two different genera. The true love-birds (genus *Agapornis*) are inhabitants of Africa, while the green love-birds of the genus *Psittacula* inhabit South and Central America. The members of both genera are remarkable for the great affection which appears to exist between males and females, and for their habit of sit-

ting huddled close together; but the statement that if one of a pair should die, its mate will also die from grief, is denied by naturalists. Examples of African love-birds are *Agapornis roseicollis* of S. Africa and *A. cana* of Madagascar. See **PARROT**.

Lovedale, an educational and mission station, Cape Colony, 30 m. W.N.W. of King William's Town. Founded by Scottish missionaries in 1841, it has since been liberally supported by the Free (now United Free) Church of Scotland.

Love-feasts. See **AGAPÆ**.

Love-in-a-mist, **FENNEL FLOWER**, and **DEVIL-IN-THE-BUSH** are names given to certain species belonging to the genus *Nigella*, a subdivision of the Ranunculaceæ. They are hardy annual plants, chiefly natives of the south of Europe. The flowers are mostly blue or white in colour, and are surrounded by mossy involucre, which seem to envelop the flowers in mist. The leaves are much divided. See **NIGELLA**.

Love-in-idleness, one of the old English popular names of the pansy or heartsease (*Viola tricolor*).

Lovaira, or **LOBEIRA**, **VASCO DE**. See **AMADIS OF GAUL**.

Lovelace, **RICHARD** (1618-58), English poet and Cavalier, was born at Betherdsen, and educated at Charterhouse and at Gloucester Hall, Oxford, where he wrote a comedy, *The Scholar*, and a tragedy, *The Soldier*, both lost. He shone at court, but preferred warfare. In 1645 he took arms on behalf of the king; and in 1646 he was fighting for France against Spain, and was wounded at Dunkirk. On his return he was imprisoned at Aldersgate, and occupied his captivity with preparing his poems for the press. His *Lucrecia* (1649) was probably Lucy Sacheverell, who is said to have married another on a false report of his death at Dunkirk. His brother published *Posthume Poems of Richard Lovelace* (1659); and an edition by Hazlitt, *Collected Poems*, appeared in 1864.

Love-lies-bleeding, a popular name for the flowering plant *Amaranthus caudatus*, belonging to the order Amaranthaceæ. It is a common annual garden plant, bearing a crowded inflorescence in the form of a spike often several feet long.

Lovell, **ROBERT** (?1770-96), English poet, was the friend of Southey and Coleridge, and a participator in their 'pantisocratic' project; but Lovell's early death prevented its realization. In 1794-5 Southey and he published *Poems by Bion and Moschus*, showing the democratic feeling and love of nature common to the Lake school of poetry.

Lover, SAMUEL (1797-1868), Irish novelist, ballad-writer, and painter, born and educated in Dublin; at first devoted himself chiefly to painting, becoming (1828) a member of the Royal Hibernian Academy. From 1835 he was a popular miniature painter in London, and at the same time made successful efforts in literature, his well-known song *Rory O'More* being written in 1826. Several plays, some novels—especially *Handy Andy* (1842)—and numerous songs, including *The Angel's Whisper*, followed in quick succession. See *Bernard's Life of Samuel Lover* (1874), and Symington's *Samuel Lover: a Sketch* (1880).

Low, SIR ROBERT CUNLIFFE (1838), British general, was born in Pifeshire; entered the Indian army (1855), and served with distinction in India, Afghanistan, Burma, and throughout the Indian mutiny. He was director of transport in the Afghan war of 1879-80, and did good service in Lord Roberts's famous march to Kandahar. During the Burmese war of 1886-8 he had command of a brigade, and for his services received a K.C.B. One of Low's most successful commands was that of the Chitral relief force in 1895, for which he was awarded a G.C.B., and promoted to the rank of lieutenant-general.

Low, SETH (1850), American politician, was born in Brooklyn, and graduated at Columbia University. He was mayor of Brooklyn (1881-5), president of Columbia University (1896-1901), mayor of New York (1901-3), and a deputy to the peace conference at the Hague (1899).

Low Archipelago, PAUMOTU, or **TUAMOTU**, archipelago of about eighty low coral islands in the Pacific, to the E. of the Society Is., between lat. 14° and 24° S. and long. 135° and 149° W. Total area, about 350 sq. m. Pearl fisheries are a source of wealth. The group was discovered (1606), and was officially annexed to France (1881). Pop. about 7,000.

Low Countries. See **BELGIUM**.

Lowe, SIR DRURY CURZON DRURY (1830), British soldier, served in the Crimea (1855-6), the Indian mutiny (1858-9), the Zulu war (1879), the Boer war (1881), and specially distinguished himself in Egypt (1882), commanding the cavalry division, and following up the victory of Tell-el-Kebir by pursuing Arabi into Cairo, where the latter gave up his sword to him. For his services he was thanked by Parliament, and received a K.C.B. (1883) and a G.C.B. (1895).

Lowe, EDWARD JOSEPH (1825-1900), English botanist, was born at Highfield, near Nottingham. From 1840 to 1882 he made a

valuable series of daily meteorological observations, and he has written numerous works and papers on meteorology, but is best known for his botanical works, which include *Natural History of British and Exotic Ferns* (1856-8), *British Grasses* (1858), *Beautiful Leaved Plants* (1861), *New and Rare Ferns* (1862), *Our Native Ferns* (1865), *Handbook on the Varieties of British Ferns* (1891), and *The Ferns of Great Britain and their Varieties* (1893-4).

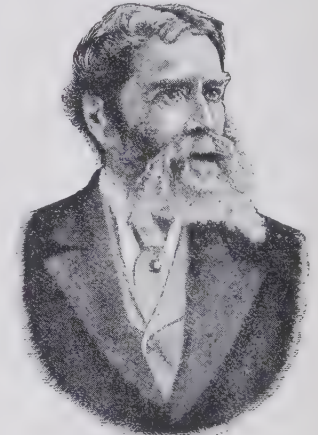
Lowe, SIR HUDSON (1769-1844), British general and governor of St. Helena, born in Galway, joined the army (1787). He then filled various posts of responsibility, both as military commander and as civil administrator, till appointed custodian of the Emperor Napoleon (1815) and governor of St. Helena, both of which duties he discharged until the death of Napoleon (1821). Charges of inhumanity were brought against Lowe, but apparently without cause; for the strained relations which existed between him and his prisoner were due rather to tactlessness than to any lack of good intentions on the part of Lowe. See *Memoir in Colburn's United Service Magazine* (April and June 1844), *Forsyth's Captivity of Napoleon at St. Helena* (1853), *Seaton's Sir Hudson Lowe and Napoleon* (1898), and *Rosebery's Napoleon, the Last Phase* (1900).

Lowe, ROBERT. See **SHER BROOKE**.

Lowell, city, Massachusetts, U.S.A., the co. seat of Middlesex co., on the Merrimack R., 25 m. N. of Boston. It has extensive manufactures of cotton and woollen goods, carpets, and machinery. Pop. (1900) 94,969.

Lowell, JAMES RUSSELL (1819-91), American poet, son of a non-conformist minister, born at Cambridge, Massachusetts, graduating at Harvard (1838), studied law, but soon took to literature. Lowell became professor of modern languages and literature at Harvard (1855), afterwards travelling in Europe to extend his knowledge. He was editor of the *Atlantic Monthly* (1857-62), and, with Professor Norton, of the *North American Review* (1864-72). In 1877 he was appointed United States minister at the court of Madrid, and from 1880-5 filled the same office in London. In 1841 Lowell published *A Year's Life, and Other Poems*, a distinct advance on which, both in manner and form, is noticeable in *Poems* (1844). *Conversations on Some of the Old Poets* (1845) is a pioneer of the author's critical method and skill; while the Mexican war of 1846 stimulated his poetical masterpiece, *The Biglow Papers*

(1848), which placed Lowell in the first rank of modern humorists. A second series (1867) was prompted by the civil war. Contemporary with the first series of the *Biglow Papers* are an *Arthurian Vision of Sir Launfal* (1848), a spirited *Ode to France* (1848), and a riotously vivacious *Fable for Critics* (1848). An adequate *Commemoration Ode* (1865) is also devoted to the Harvard heroes lost in the civil war. The poet's nimble fancy and love of natural beauty are illustrated in *Under the Willows* (1868). Several occasional poems of later years—*The Cathedral* (1869), *On the Death of Agassiz* (1874), and three patriotic odes (1875-6)—are specially meritorious. The concluding volume of poems was *Heartsease and Rue* (1888). Lowell's essays are learned, happily allusive, and graceful. *Fireside*



James Russell Lowell.

Travels (1864), *My Study Windows* (1871), *Among my Books*, two series (1870-5), all have descriptive and critical articles of permanent value and charm. *Democracy, and Other Addresses* (1887) contains several admirable orations delivered by the author when minister in England. *Political Essays* (1888) touch on American interests in the latter half of the 19th century. *Latest Literary Essays* appeared (1892), and *Impressions of Spain* (1900). See *Lowell's Letters*, edited by Norton (1894), and Hale's *James Russell Lowell and his Friends* (1899).

Löwenberg, tn., prov. Silesia, Prussia, on the Bober, 27 m. W.S.W. of Leignitz. The town hall dates from the 16th century. In the vicinity are gypsum and sandstone quarries. There are also linen, cotton, and woollen mills. Pop. (1901) 5,290.

Lower Austria. See **AUSTRIA, LOWER**.

Lowestoft, munic. bor., seapt., and bathing resort in Suffolk, England, 10 m. S. of Yarmouth. It is a rising and fashionable place, near the Norfolk Broads, with excellent yachting accommodation and a bracing climate. The town comprises two parts. The north, or old town, is situated on a cliff, below which is a tract called The Denes, with golf links, bordering the shore. St. Margaret's Church is a beautiful 14th-century edifice with earlier tower. Kirkley has a fine esplanade and sea-wall connecting with the south (promenade) pier. A fine esplanade has also been constructed above the Denes at the N. end of the town. The fisheries are important. Pop. (1901) 29,842. Off the coast, on June 3, 1665, a great naval battle took place between an English fleet under James, Duke of York, and a Dutch fleet under Obdam van Wassenauer. Obdam was killed, and the Dutch were driven to their ports.

Lowicz, tn., Warsaw gov., Poland, W. Russia, 45 m. W.S.W. of Warsaw; cap. of district, on the Bzura. Industries include flax, manufacture of refined wax, and tanneries. Pop. (1897) 12,434.

Lowland in general means land which does not rise more than from 600 to 1,000 ft. above the sea. Its limit is usually represented on orographical maps by the 600 ft. or 200 metre contour lines. Accepting the 200 metre (660 ft.) line, and excluding Antarctic lands, the area of lowlands is nearly three-tenths of the total land surface, or 15½ million sq. m. This is on the N. of the mid-world mountain system in Eurasia, and W. of the Pacific mountain system in America. There is little in Africa (15 per cent.), mainly in the N. and W. of the Sahara, and 55 per cent. in Europe, while in Australia the lowland E. of the Eastern highlands is extensive, and raises the percentage to 36.

All kinds and ages of rocks can be found in the lowlands. They may be composed of ancient crystalline rocks, as in the Baltic and Hudson regions; of flat Palæozoic rocks, as in the tabular plains of Russia and N. America adjoining these; or of recent deposits, as in the marshy lands of Western Siberia, in growing deltas, such as that of the Nile, in marine accumulations on rising coastal areas, as in the low-lying Floridas and the coastal plain to the N., in desert areas of wind-bared or sand-covered surface, as in Turan and the lower parts of the Sahara. They may also be underlain by rocks greatly faulted or folded, or both, as in the lowlands of Belgium.

The lowlands of the world present every variety of vegetation, according to the climatic regions in which they are found, and also every phase of economic development. They are among the least-peopled (e.g. low-lying tundra and desert) and the most densely-populated parts of the globe, such as N. China, Ganges, and Belgium, with over 500 persons per sq. m. Where the climate and drainage permit, they are the most favoured lands, and easy to exploit and to traverse.

Low Sunday, the Sunday after Easter; also called *Dominica in albis depositis*, because those who had been baptized on Easter Eve then first laid aside their white robes. The name Low Sunday was given partly to contrast it with the high festival to which it succeeded, partly perhaps because, as the octave of Easter Day, it was considered a continuation of the feast, though in a lower degree.

Lowth, ROBERT (1710-87), English ecclesiastic and scholar, born



J. W. Lowther, Speaker of the House of Commons.
(Photo by Russell & Sons.)

The stage of economic evolution of the inhabitants is, however, a most important factor in the economic significance of lowlands, as is shown by comparing the worth to the world of the North or South American prairies, and the Russian and Siberian steppes to-day and a hundred years ago. Though the lowlands form only three-tenths of the land, they probably support at least six-tenths of the inhabitants of the world.

at Buriton, Hants; was appointed to the chair of poetry at Oxford (1741), resigning on his appointment to the archdeaconry of Winchester (1750). His short tenure of the see of St. Davids (1766) was followed a few months later by his presentation to that of Oxford, whence he was translated to London (1777). In 1783 he declined the primacy. His *De Sacra Poesi Hebræorum Prælectiones Academicæ* (translated in 1787 as *Lectures on the Sacred*

Poetry of the Hebrews), published in 1753, marked a new departure, in the application to Biblical poetry of the ordinary criteria of literary criticism. Among his other works are a *Life of William of Wykeham* (1758); an excellent *Short Introduction to English Grammar* (1762), often reprinted; and *Isaiah: a New Translation* (1778). An edition of his *Popular Works* appeared in 1843. See *Life and Writings of Bishop Lowth* (1787), and *Memoir by Hall in Lowth's Sermons and Other Remains* (1834).

Lowther, JAMES (1840-1904), English politician, educated at Cambridge, and called to the bar (1864); began his parliamentary career as M.P. for York (1865), a seat which he held till 1880, afterwards representing N. Lincolnshire (1881-5). Under Disraeli he became (1868) parliamentary secretary to the Poor Law Board, and under-secretary for the colonies (1874-8), being transferred to the Irish office as chief secretary (1878), a position he held till 1880. He failed to secure re-election for N. Lincoln (1885), and was not seen again in Parliament till 1888, when he was returned for the Isle of Thanet division of Kent. He was an ardent protectionist. Lowther was a prominent member of the Jockey Club, and keenly interested in the national sport.

Lowther, JAMES WILLIAM (1855), Speaker of the House of Commons, first entered Parliament as member for Rutland (1883). He accepted office as under-secretary for foreign affairs in 1891; was elected chairman of Committee of Ways and Means and deputy-speaker in 1895, and became Speaker, June 1903, on the retirement of Mr. Gully.

Loyalty Islands, group of islands, consisting of three large and numerous small islands, in the S. Pacific, forming a chain parallel to and included in the French administration of New Caledonia, at a distance of 60 m. E. of that island. The larger islands are Uea, Lifu, and Mare. Total area, 800 sq. m. The islands grow bananas and export sandal wood. Pop. (end of 1901) 14,800.

Loyola, IGNATIUS DE—INIGO LOPEZ DE RECALDE—(c. 1492-1556), the founder of the Jesuits, born of a noble family in the Spanish province of Guipuzcoa. Like three of his elder brothers, he followed the career of arms; but the perusal of the *Life of Christ* by Ludolphus, and of certain lives of the saints, induced him to forsake the world and to consecrate himself to the service of religion. He spent ten months in a cave near Manresa, practising terrible austerities, and here he composed the famous book

of *Spiritual Exercises*, which was to prove so powerful an influence in the training of his followers. It was probably also at this time that the idea began to take shape in his mind of recruiting in the cause of Jesus Christ a regiment (*compañía*) which should be a *corps d'élite*, drilled to a most perfect discipline, and ready to volunteer for any emergency or forlorn hope. Having by this time learnt the necessity of educating himself better for the task before him, he went to school with children to learn the rudiments of Latin, and then studied at the universities of Alcalá, Salamanca, and Paris. At Paris he gathered round him a small band of companions, the most famous of whom was St. Francis Xavier, and at Montmartre, on Aug. 15, 1534, they all took vows together which bound them to place themselves after an interval at the disposition of the reigning pontiff. These companions came to Rome in 1537, and were cordially welcomed by Paul III., who in 1540 issued a bull approving the new order. Ignatius was elected general (1541), and, in spite of his efforts to resign, was compelled to retain the office till his death. Recruits now poured in, and endless fields of activity, more especially in the form of colleges for the young and missions to the heathen, were opened up for the new 'Company of Jesus,' as its founder had designated it. Ignatius remained continuously in Rome, writing the constitutions of the order and maintaining a vast correspondence with the members of his society in every part of the world. He was canonized (1622). His day is July 31.

For the early portion of the life of Ignatius, the sole authority is a brief autobiography dictated by himself in 1554. It has been translated by Rix, under the title of *The Testament of Ignatius Loyola* (1900). Of the complete Lives, the best in English are those by Genelli (1871) and Stewart Rose (1870). In French the *Life* by Bartoli, edited by L. Michel (1893), incorporates the results of modern research. The correspondence of the saint, chiefly in Spanish, is given most completely in the *Monumenta Historica Societatis Jesu* (1894). See also Druffel's *Ignatius v. Loyola* (1879), Gothein's *Ignatius v. Loyola und die Gegenreformation* (1895), and Joly's *Ignace de Loyola* (1898).

Lozère, dep. of S. France, formed mainly from the old Languedoc and Gévaudan, and deriving its name from Mt. Lozère, a peak of the Cévennes. It is one of the most mountainous departments of France, and

is divided into three parts, differing in aspect as in geological formation. The mountain pastures bear many cattle and sheep. There are extensive forests. Iron and lead are mined, and marble, granite, lithographic stone, and slate are quarried. Flax, hemp, and fruits are produced, and silkworms are bred. There are three arrondissements—Mende (cap.), Florac, and Marvejols. Area, 1,996 sq. m. Pop. (1901) 128,900.

L.R.C.P., Licentiate of the Royal College of Physicians.

L.S., *loco sigilli*—i.e. 'the place of the seal.'

Luang-Prabang, cap. since 1896 of Upper Laos, French Indo-China, on the l. bk. of the Mekong, at the confluence of the Nam-khan. Pop. about 12,000.

Lupula. See CONGO.

Lubao, tn., prov. Pampanga, Luzon, Philippines, 5 m. S. of Bacolor, in a rich sugar, indigo, and rice district. Pop. (1899) 21,175.

Lübben, tn., prov. Brandenburg, Prussia, on riv. Spree, 47 m. S.S.E. of Berlin, has sawmills and shoe factories. Pop. (1900) 6,818.

Lubbock, SIR JOHN. See AVEBURY.

Lübeck. (1.) State of the German empire, on either side of the Trave, comprising the towns of Lübeck and Travemünde and five rural communes; area, 115 sq. m.; pop. (1900) 96,775. The country is fertile, well wooded, and produces rye, wheat, barley, potatoes, oats, hay, and large quantities of fruit. By its constitution, revised in 1875, the state is governed by a senate composed of 14 life members and a council of 120 citizens. Lübeck is represented in the Reichstag by one delegate. (2.) Free city, one of the three remaining Hanse towns, on the Trave, 10 m. from its mouth, and 39 m. N.E. of Hamburg. Opposite the railway station, on the main approach to the city, is the famous Holsten-thor, a 15th-century brick-built gateway, renovated in 1870. Of its numerous churches the Marienkirche, founded in 1170, contains valuable works of art. Its dome, enlarged during the 13th century, has an altar painting by Hans Memling. The town hall (1250) is built of black glazed bricks in the style of the Renaissance period. Since Lübeck joined the Customs Union in 1868 its trade and commerce have made considerable progress. The principal shipping trade is with Denmark, Sweden, Russia, and Finland, chiefly in machinery, chemicals, preserved food, linen goods, and cigars. Founded in 1140, Lübeck was ceded to the dukes of Saxony in 1158, and captured by the Danes in 1201.

After their expulsion it was made a free imperial city (1226), and became the leader of the Hanseatic league (1241). Annexed by France (1810), it once more regained its liberty in 1813, after the battle of Leipzig. In 1866 it joined the North German Confederation, and in 1870 became one of the states of the new empire. Pop. (1895) 69,874; (1900) 82,098.

Lublin. (1.) Government of Poland, W. Russia, occupying the S.E. angle of same. The Vistula borders it on the w., the Polish Bóg on the E., and the Wieprz crosses it. Of the surface, almost one-third is forest, less than a twelfth is pasture land, and most of the rest is arable. Chief crops: rye, wheat, oats, potatoes; of less importance are hemp, flax, beetroot. The chief industries are distilling and sugar-making; then come flourmilling, brewing, tanning, sawmilling, and furniture-making. Chief exports: grain, wool, wood. The Vistula is the chief waterway. Area, 6,501 sq. m. Pop. (1897) 1,159,463. (2.) City, Poland, W. Russia, cap. of above gov., 100 m. S.E. of Warsaw, on the Bistrzyca or Bistrzsa, a tributary of the Wieprz (Vistula basin). Amongst the interesting edifices are a 13th-century cathedral and the old palace of John Sobieski. It has considerable trade, especially in corn, wine, and linen cloth. Distilleries, breweries, tanneries, brickworks, soap, tobacco, and candle manufactures, and flour mills are the main industries. Pop. (1897) 50,152.

Lubni, tn., Poltava gov., S.W. Russia, 75 m. W.N.W. of Poltava city, cap. of dist., on the r. bk. of the Sula, a tributary of the Dnieper. Pop. (1897) 10,108.

Lubricants and Lubricators are materials that are introduced between moving surfaces, in order to reduce the friction between them, and to prevent them becoming hot. Lubricants are of very varied nature, differing according to the nature of the surfaces in contact, and the speed, pressure, and temperature at which the motion takes place. They may be either solid, semi-solid, or liquid—the first-named, such as graphite or French chalk, acting chiefly by filling up the roughnesses of the surfaces in contact, and coating them with a soft and slippery material. They have only a limited application, and are chiefly used for wood and rough iron bearings. Liquid and semi-solid lubricants are of far greater importance, and vary from limpid oils to stiff greases, being almost invariably either hydrocarbon oils, of mineral origin and of high boiling point; vegetable or animal fatty

oils, such as olive, rape, castor, lard, and sperm oils; or mixtures of the two, often thickened or 'solidified' with soaps and other



FIG. 1.

substances. These lubricants act principally by converting, to a greater or less extent, the sliding or rolling friction between the parts into the much smaller fluid friction between the particles of the liquid. They should, there-

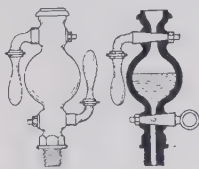


FIG. 2.

fore, have sufficient viscosity to prevent them being squeezed out by the pressure, though not so much as to hinder the motion. A lubricant should not be volatile, or decomposed by heat, or congeal with cold; the former



FIG. 3.

quality being especially important in those oils used to lubricate the interior of cylinders of engines, particularly gas-engines, in which the temperature is very high. Heavy hydrocarbon oils are best for this purpose.

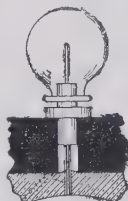


FIG. 4.

It is also important that a lubricant should not be oxidized by exposure to the atmosphere, and thus clog or 'gum;' neither should it be acid, so as to act

upon the metal of the bearings, and in this respect the hydrocarbons are better than most other oils. Finally, it should not be readily inflammable, and should be able to carry off any heat generated by what friction there is. This latter and many of the former conditions are greatly assisted by systems of forced lubrication, by which the lubricant is continuously supplied to the bearing under pressure. Semi-solid lubricants of the nature of 'solidified' oils, hydrocarbons such as vaseline and the like, are also applied in this way, and prove very effective with heavy machinery.

Lubricators are the mechanical contrivances used to ensure a constant supply of the oil or other lubricant to rubbing surfaces. There are several well-defined forms of lubricators, the most important of which are here given. Fig. 1 shows a *siphon lubricator*, one of the commonest forms for simple bearings. The oil is siphoned out of the cup, down the centre hole leading to the bearing, by means of a wick, which should first be well soaked in oil. The end of the wick should hang lower than the bottom of the cup; the supply of oil is regulated by the amount of wick used. When the machine is stopped, the wick should be lifted out to prevent the oil being wasted. Fig. 2 shows a simple form of *cup lubricator*, used to supply oil to a vessel under pressure, as the steam-chest or cylinder of an engine. The lower cock being closed, the cup is filled with oil, and on closing the upper cock and opening the lower the oil runs into the cylinder. Fig. 3 shows the *Staruffer lubricator*, in which semi-solid grease is used as a lubricant. The cap of the lubricator is filled with the grease, and then on screwing it down the grease is forced along the pipe to the bearing. In practice, an occasional turn of the cap is all that is necessary. Fig. 4 shows a *needle lubricator*, a type much used for shafting. It consists of a reservoir, usually of glass, having a hole at the bottom through which a wire needle passes, the needle being an easy fit in the hole, and the bottom end resting on the shaft. When the shaft is stationary, capillary attraction prevents the flow of oil past the needle; but when the shaft is in motion, the vibration of the needle allows a small amount of oil to pass. For passing oil into the steam-pipe or valve-chest of a steam-engine, a *sight-feed lubricator* is often used. In this form of lubricator steam is condensed in a small coil provided for the purpose,

and displaces the oil drop by drop. The oil passes up through a glass tube on its way to the steam-pipe or steam-chest, so that the amount supplied can be observed. A small valve is provided for adjusting the amount. If a bearing is to carry a very heavy load, a force-pump is used to force oil into the bearings. Sometimes a very heavy vertical shaft is water-borne or oil-borne. In the case of dynamo bearings, lubrication is generally effected by a loose ring which lies on the journal and also dips into an oil cistern. See Archbutt and Deeley's *Lubrication and Lubricants* (1900), and Hurst's *Lubricating Oils, Fats, and Greases* (1893; 2nd ed. 1902).

Luca della Robbia. See ROBBIÀ.

Lucan, GEORGE CHARLES BINGHAM, EARL OF (1800-88), English field-marshal, was born in London, and entered the army (1816). In command of the cavalry in the early part of the Crimean war, it fell to him at Balaklava to carry out the order which resulted in the disaster to the Light Brigade. Blamed by Lord Raglan, he was recalled, but was not generally held to be responsible for the blunder. He published *English Cavalry in the Army of the East* (1856). See Kinglake's *The Invasion of the Crimea* (1863-87).

Lucan, MARCUS ANNEUS LUCANUS (39-65 A.D.), the chief Roman poet of the 'silver age,' a native of Corduba in Spain; was educated at Rome under the Stoic Cornutus, and acquired a reputation at an early age. Nero made him quaestor—a distinction which gave him a seat in the senate. Unfortunately Nero himself claimed to be a literary genius, and found a rival in Lucan. At a public contest the two competed, and the prize was awarded to Lucan. This aroused Nero's jealousy, and he forbade Lucan to publish or recite poems. In his resentment Lucan joined Piso's conspiracy against Nero (65 A.D.), and when the plot was detected he was put to death. His only surviving work is the *Pharsalia*. It tells the story of the civil war between Caesar and Pompey, but is unfinished. The best editions are by Weber (1821-31), Haskins (1887), and Hosius (1892).

Lucania, a mail steamer of the Cunard Line, built in 1893. She is 610 ft. long, of 12,950 tons gross, of 30,000 indicated horse power, and of 22 knots speed.

Lucania, div. of ancient Italy, bounded on the N. by the riv. Silarus, separating it from Campania; on the E. by Apulia and the Gulf of Tarentum; and on the S. by the river Iaus, which

separated it from Bruttium. The Lucanians were of Samnite race, and were subdued by the Romans in 272 B.C. See Mommsen's *History of Rome*.

Lucaris, CYRIL (c. 1572-1638), Greek prelate and theologian, native of Crete, imbibed in Switzerland many of the Protestant doctrines, which he strove to introduce during his patriarchate at Alexandria, and subsequently at Constantinople, whither he went in 1621. These efforts led to his banishment to Rhodes and Tenedos successively, and ultimately to his sudden and violent removal from Constantinople, when he is believed to have been strangled. See *Life* by Pichler (1862).

Lucas, JOHN SEYMOUR (1849), English historical and portrait painter, born in London, trained at the Royal Academy schools, was elected A.R.A. (1886), and R.A. (1898). Among his best works are *The Armada in Sight* (1880), a vigorous representation of Drake finishing his game of bowls on Plymouth Hoe; *William the Conqueror Granting the First Charter to the City of London* (1898), a fresco in the Royal Exchange; *After Culloden* (1884), purchased by the Royal Academy; *Flirtation*, in the Guildhall Gallery. In 1901 Mr. Lucas was commissioned by King Edward VII. to paint the reception of the Moorish embassy.

Lucas van Leyden (1494-1533), Dutch painter and engraver, was the chief rival of his contemporary, Albrecht Dürer. Displaying his gifts at a very early age, he had at sixteen produced a number of engravings, including a famous *Ecce Homo*. Among his paintings the best examples are *The Last Judgment*, at Leyden; *Christ Healing the Blind Man of Jericho*, at St. Petersburg; and *The Card Party*, at Wilton House, England.

Lucban, tn., prov. Tayabas, Luzon, Philippines, 8 m. N.W. of Tayabas; manufactures straw hats and mats. Pop. 12,800.

Luca, tn., cap. prov. Luca, Tuscany, Italy, on riv. Serchio, 13 m. N.E. of Pisa. Its cathedral of San Martino (11th century) is rich in paintings and sculpture. Many of its churches are built of Carrara marble, and are fine examples of mediæval architecture. The ducal palace possesses a fine picture gallery. The town has extensive silk mills; jute, velvets, tobacco, and cottons are also manufactured. Luca has been the seat of an archbishop since 1726. Its history dates from 177 B.C., when it was taken by the Romans. In the 12th century A.D. it became a free town. In 1799 it was taken by the French, and in 1805 was erected into a

principality by Napoleon I. for his sister, Princess Bacciochi. In 1847 the duchy of Luca was united to Tuscany, and in 1860 it was annexed to the kingdom of Italy. In the valley of the Serchio R. are the famous baths of Luca. Pop. (1901) 74,971.

Lucena, city, prov. Cordova, Spain, 37 m. S.E. of Cordova; manufactures textiles, bronzes, and earthenware. Red wines and brandy are also produced; and a famous breed of horses is reared in the neighbourhood. Pop. (1900) 21,300.

Lucera, tn., prov. Foggia, S. Italy, 12 m. W.N.W. of Foggia; has a cathedral (14th century), formerly a Saracenic mosque, and a castle of Frederick II. Trade in silk. Pop. (1901) 17,515.

Lucerne (grass). See ALFALFA. **Lucerne** (Ger. *Luzern*). (1.) Swiss canton, ranking after Zürich and Bern, and admitted into the Swiss confederation (1332). Area, 580 sq. m. Pop. (1900) 146,474, mainly German-speaking Roman Catholics. (2.) Town, cap. of above canton, picturesquely built on both banks of the Reuss as it issues from the lake. It is now the chief centre of foreign tourists in summer, and is on the main line of the St. Gothard Ry. To the E. rises the celebrated viewpoint of the Rigi, and to the S.W. that of Pilatus. The main features of interest in the town are mediæval towers and walls, the bridges (five) including the covered wooden bridge, with its paintings representing scenes from the lives of patron saints, and a 'Dance of Death'; the Quai National and the Schweizerhof Quai, the latter with a fine avenue of chestnut trees; the Hofkirche, erected in 1506; the town hall, containing antiquarian and art collections; and the 'Lion of Lucerne,' a rock monument modelled by Thorwaldsen commemorating the heroic defence of Louis XVI.'s Swiss Guards during the attack on the Tuileries (Aug. 10, 1792). An inscription beneath records the names of the twenty-one officers. The glacier garden exhibits remarkable pot holes. Pop. (1901) 29,633. (3.) LAKE ('Lake of the Four Forest Cantons'), one of the most beautiful of European lakes, bordered by the cantons of Schwyz, Uri, Unterwalden, and Lucerne. Roughly cruciform in shape, it covers an area of 44½ sq. m.; has a length of about 23 m., and a depth of 700 ft.; its alt. is 1,434 ft. The lake is subject to sudden and violent storms. Its shores are associated with the authentic and legendary history of the Swiss Confederation. The Rütli and Tell's Platte are inseparably linked with the fame of William Tell.

Lu-chu. See LOO-CHOO.



Picture by John Seymour Lucas—'After Culloden.'
Royalist soldiers searching for fugitives of the army of Prince Charles Edward.

Lucian (c. 120-190 A.D.), the greatest Greek writer of the Christian era, was a native of Samosata on the Euphrates. Lucian was first apprenticed to his uncle, a sculptor, but abandoned this art for literature. He became known as a rhetorician, and travelled to Greece and Italy, and even to Gaul, where he was for a short time a professor of rhetoric. By 160 A.D. he was in Antioch, but removed to Athens, where he found the best appreciation of his work. The majority of his writings were produced between 160 and 180 A.D. The works attributed to Lucian number eighty-three; the genuineness of

The best editions of his works are those of Dindorf (1858), Jacobitz (1874), and Sommerbrodt (1886-93). There is an English translation by Franklin (1781), which is nearly complete; a complete translation (Athens, 1895); also one by Irwin (1894) of six dialogues, one by Campbell Davidson (1902) of several others, and a translation of his works by H. W. and F. G. Fowler (1905). See also Collins's *Lucian* (in *Ancient Classics Series*, 1873), Croiset's *La Vie et les Œuvres de Lucien* (1882), Mahaffy's *History of Classical Greek Literature* (1880), and Hime's *Lucian the Syrian Satirist* (1900).

in Isaiah, Tertullian, Gregory the Great, and other fathers regard the name as applying to Satan.

Lucigen Lamp. See LAMPS.

Lucilius, GAIUS (148-103 B.C.), born at Suessa, was the founder of the Roman school of satirical poetry, represented in later centuries by Horace, Persius, and Juvenal. He wrote with extreme rapidity and carelessness; but his vigour, his wit, and his imagery at once made him one of the first of Latin poets. Of his works some eight hundred fragments remain. Cicero, Horace, and Quintilian are the chief ancient authorities on his life. See also Mommsen's *Hist. of Rome* and Mackail's



Lucerne and Mount Pilatus.

but forty-eight of these has never been assailed, and perhaps about twenty are undeniably spurious. The *Hermotimus* attains to fifty-seven octavo pages, but many of his other works are only a few pages long. It is as a satirist that he has won immortality. Perhaps his most characteristic works are those which deal with the next world, the *Dialogues of the Dead*, the *Necyomanteia*, and others; those which satirize the gods, the *Tragic Zeus*, the *Icaromenippus*, and others; but his *Vera Historia* has had more influence on modern literature, having inspired Rabelais, Swift, and Voltaire.

Lucifer. (1.) Is properly the Latin name of the planet Venus when it appears as a morning star; it corresponds to the Greek Phosphorus. As the evening star, it is called Vesper or Hesperus. (2.) In mythology, Lucifer was represented as a son of Astræus or Cephalus and Aurora (the dawn). (3.) The name is used in the A. V. of the Bible to translate the Heb. *hêlêl*, 'shining one,' R. V. 'day star,' in Isa. 14:12, and is there applied to the king of Babylon (or Assyria). Owing to a false comparison of Luke 10:18 ('I beheld Satan as lightning fall from heaven') with the passage

Latin Literature (1895). The best editions of the fragments are those of Müller (1872) and Lachmann (1876). Müller also published *Leben und Werke des Lucilius* (1876).

Lucina, in Roman mythology the goddess of light, or rather the goddess who brings to light, presiding over the birth of children. Both Juno and Diana had the surname of Lucina. She corresponds to the Greek Ilithyia.

Lücke, GOTTFRIED CHRISTIAN FRIEDRICH (1791-1855), German Biblical exegete, was born near Magdeburg. He was called to the chair of theology at Bonn

(1818), and to Göttingen (1827). His great work is his *Grundriss der N.T. Hermeneutik* (1817), which, while fixing the scientific principles of exegesis, demands as equally necessary the presence of the religious sense. He exemplified his theories in his *Kommentar über die Schriften des Evangelisten Johannes* (1820-25; partly trans. by Repp in the Bib. Cabinet), and also wrote an introduction to the *Offenbarung des Johannes* (1832). See Sander's *Biographie* (1890), and Schleiermacher in *Studien und Kritiken* (1834).

Luckenwalde, tn., prov. Brandenburg, Prussia, on the Nuthe, 30 m. s.s.w. of Berlin, has woolen manufactures, machine shops, brick fields, and iron foundries. Pop. (1900) 20,936.

Lucknow, chief tn. of div. of same name, and cap. of prov. of Oudh, is a cantonment and municipality on the Gumbi, 610 m. n.w. of Calcutta. The river forms a waterway to the E. coast. Lucknow is picturesquely situated. Its chief architectural features are the fort, the Imambara, or mausoleum of Asaf-ud-Daula, and the Jama Masjid. The manufacture of muslins and shawls, gold and silver embroidery, glass, and pottery were are its principal industries. Lucknow is an important educational centre, having, besides the Canning and Martinière Colleges, numerous missionary schools. Pathetic interest is attached to the ruined residency, with its cross and graveyard in memory of those who perished in its gallant defence against the mutineers in 1857. Pop. (1901) 264,049. See Innes's *Lucknow and Oude in the Mutiny* (1895).

Lucon, tn., dep. Vendée, France, 19 m. s.e. of La Rochesur-Yon, on canal of Lucon. Seat of a bishop since 1317. Manufactures liqueurs, and has copper and iron founding. Pop. (1901) 6,757.

Lucretia, the wife of Lucius Tarquinius Collatinus. It is said that when the Romans were engaged in the siege of Gabii, Lucius Tarquinius and other nobles vied with each other in praising the virtue of their wives. To test which best deserved their praise, they returned suddenly to Rome, and found Lucretia alone, duly engaged in her household tasks. Soon afterwards her husband's cousin, the infamous Sextus Tarquinius, forced his way into her house at night and outraged Lucretia. Next morning she summoned her husband and father, and after telling her sorrow she stabbed herself to death (509 B.C.). The tale is told by Livy and Ovid. See Shakespeare's *Rape of Lucrece*.

Lucretius (c. 98-55 B.C.), Roman poet, whose full name was Titus

Lucretius Carus. Practically nothing is known of his life. His great work, *De Rerum Natura*, a poem in six books, amounting to upwards of 7,400 hexameters, is an exposition of the philosophy of Epicurus, in which he believed. It is Lucretius's first object, as it was that of Epicurus, to free mankind from the fear of the supernatural, of death and the life hereafter. The world arose from the fortuitous concurrence of atoms moving through space. Gods indeed existed, but they did not interfere with human concerns. Thus all phenomena were material in origin, and death simply meant the resolution of the body into its component atoms. This philosophy Lucretius expounds with extraordinary clearness, force, and dignity; yet the best parts of his poem, to modern readers, are his digressions—as, for example, on the fear of death, the origin of the world, the development of society, and the description of the plague of Athens. Of all Latin poets, Lucretius best represents Roman dignity. The best editions are those of Lachmann (1866), Munro (with explanatory notes, 1891-3), and Briege (1894); bks. i. to iii., Lee (1882); bk. v., Duff (1888). Eng. trans., verse, Creech (1882); prose, Munro (1873). See Malloch's *Lucretius* (Ancient Classics, 1878), Masson's *Atomic Theory of Lucretius* (1884), and Mackail's *Latin Literature* (1895).

Lucrinus Lacus, the Lucrine lake, was really only the inner part of the Bay of Cumæ (*Sinus Cumanus*), off the coast of Campania, in ancient Italy; but at an early date it was separated from the rest of the bay by a dike about a mile long. It was famous for its oyster beds. Agrippa, the minister of Augustus, made a passage from the lake of Avernus into the Lucrine lake, and from that into the sea, thus constructing the great Julian harbour. In 1538 A.D. the Lucrine lake was filled up by a volcanic eruption, a conical hill, the Monte Nuovo, being formed on its site. See Grasse's *Orbis Latinus* (1861).

Luculia, a genus of evergreen shrubs, order Rubiaceæ. The two species are *L. gratissima*, a native of the Himalayas, which bears terminal, many-flowered cymes of rose-coloured flowers; and *L. pinceana*, a native of the Khasia mountains, with large white flowers. They like a light, peaty soil, with plenty of roof room.

Lucullus, LUCIUS LICINIUS (c. 110 B.C. to 57 B.C.), famous Roman general, belonged to a plebeian family; first distinguished himself in the Social war, and then accompanied Sulla to Asia as his quaestor in the war against Mithridates, in which he did good

service, remaining in Asia until 80 B.C. In 77 B.C. he was prætor, and afterwards governed Africa with justice and success. In 74 he became consul, and in the campaigns of 74, 73, and 72 destroyed Mithridates's forces, conquered his kingdom of Pontus, and drove the king himself to take refuge in Armenia. In 69 war broke out with Armenia, as Lucullus required Tigranes, the Armenian king, to surrender Mithridates; and in that year he gained a brilliant victory over Tigranes. In 68 he advanced far into Armenia, but next year had to retreat. He was then superseded by Pompey. After his return to Rome, Lucullus took little part in politics, but lived a life of luxury. Plutarch has left a life of Lucullus. See also Mommsen's *History of Rome*.

Lucy, HENRY W. (1845), 'Toby, M.P.' of *Punch*, was born near Liverpool. He joined the staff of the *Pall Mall Gazette* (1870) and the *Daily News* (1873), being the chief of the gallery staff on the latter paper, at the same time writing 'Under the Clock' for the *World*—a column afterwards transferred to the *Daily Telegraph*. On the death of Tom Taylor, in 1880, he took up the writing of 'The Essence of Parliament' for *Punch*, which, under the title of 'The Diary of Toby, M.P.', is still one of the brightest articles in the weekly press. He has written diaries of the various Parliaments since 1880, and various other works, including *Faces and Places* (1895); *Mr. Gladstone: a Study from Life* (1896); *Peeps at Parliament* (1903); and *Later Peeps at Parliament* (1905).

Luddite Riots were the outbreaks in which the popular discontent expressed itself in the Midlands about 1811-18. General distress being caused by the progress of the industrial revolution, the anger of the rioters was directed against the new machinery, much of which was destroyed. The name was derived from Ned Lud, a Leicestershire imbecile, who, in a fit of passion, demolished two stocking-frames. See Pellow's *Life of Lord Sidmouth* (1847), and Peel's *Risings of the Luddites, Chartists, and Plug-drawers* (2nd ed. 1888).

Lüdenscheid, tn., Westphalia, Prussia, 19 m. s.e. of Barmen. Manufactures cutlery, musical instruments, hardware, machinery, and cotton; has also iron foundries. Pop. (1900) 25,520.

Lüderitz Bay. See ANGORA PEQUENA.

Ludhiana, cap. of Ludhiana dist., Jalundhar div., Punjab, India, 73 m. n.w. of Ambala; was founded in 1480 by the Delhi princes of the Lodhi family. It has trade in grain, and manufac-

tures shawls, cloths, turbans of Rampur wool. The shrine of Abdul-Kadir-i-Jalani attracts many pilgrims. Pop. (1901) 48,600. The district has an area of 1,375 sq. m., and a population (1901) of 673,000.

Ludington, city and co. seat and summer resort, Mason co., Michigan, U.S.A., on Lake Michigan, at the mouth of Marquette R., 105 m. N.W. of Grand Rapids; possesses an excellent harbour; has trade in lumber, grain, and fruit. Pop. (1900) 7,166.

Ludinovsk, tn., Kaluga gov., Central Russia, on a branch of the Orel-Smolensk railway, 27 m. N.E. of Jukovkay. Has locomotive, carriage-building, iron, and glass industries. Founded in 1755. Pop. (1897) 12,000.

Ludlow, munic. bor., Shropshire, England, 12 m. N. of Leominster, at the confluence of the Corve and Teme. St. Lawrence Church is ancient, and one of the old town gateways still stands. The castle, founded soon after the conquest, was an occasional royal residence. Here Butler wrote *Hudibras*, and here Milton's *Comus* was first performed (1634). Pop. (1901) 6,328.

Ludlow, EDMUND (1617-93), English soldier and republican, was born at Maiden Bradley, Wiltshire. Returned to Parliament by Wiltshire in 1645, he was partly responsible for 'Pride's Purge'; he sat as one of the king's judges, and signed his death-warrant. In 1651-2 he did much towards the subjugation of Ireland; but disagreement with Cromwell led to his retirement from public life until the protector's death. Re-entering Parliament (1659), he was impeached for treason in 1660, and forced to flee to Vevey, where he died. His valuable *Memoirs* were published at Vevey (1698-9). See also Guizot's *Portraits Politiques des Hommes des différents Partis* (1852); trans. by Scoble as *Monk's Contemporaries* (1851).

Ludwig, or **LOUIS**, The German emperors of this name are:—**LOUIS I.** (778-840), 'le Débonnaire,' son of Charlemagne, whom he succeeded as emperor in 814, but was deposed by his sons.—**LOUIS II.** (c. 822-875), son of Lothaire I.; became associated with his father in 849, and succeeded to the imperial crown in 855.—**LOUIS III.** (c. 880-929), 'the Blind,' grandson of Louis II.; became emperor in 901, but, owing to his infirmity, was only nominal ruler.—**LOUIS IV.** (893-911), 'l'Enfant,' last of the Carolingians; succeeded his father, Arnulph, in 900. He was defeated by the Hungarians (907-910).—**LOUIS V.** (c. 1287-1347), 'the Bavarian'; was elected emperor (1314), quarrelled with Pope

Benedict XII., and was excommunicated for denying papal authority in Germany. He was opposed by Clement VI., who promoted the election of Charles of Moravia as emperor in 1346.

Ludwig I. (1786-1868), king of Bavaria, son of King Maximilian Joseph, whom he succeeded (1825). He supported the Greek struggle for independence (1826), erected the Walhalla in Munich (1830), and abdicated on his refusal to grant political reforms (1848).

Ludwig II., OTTO FRIEDRICH WILHELM (1845-86), grandson of the preceding, succeeded his father, Maximilian II. (1864); opposed Prussia in the war of 1866, but joined the German empire (1870). As ruler of the chief German state, he had the honour of inviting the king of Prussia to become German emperor. He was a vigorous opponent of the Ultramontanes, against whom he gave a strong support to his Liberal ministers. An extraordinary passion for building palaces on a huge and expensive scale induced an inquiry to be made as to his mental condition, and he was declared insane. Shortly afterwards he drowned himself in a neighbouring lake. Ludwig was the lifelong friend and supporter of Richard Wagner, on whom he showered gifts and honours.

Ludwig, KARL FRIEDRICH WILHELM (1816-95), German physiologist, born at Witzenhausen, Hesse; became professor of anatomy and physiology at Zürich (1849), at Vienna (1855), and of physiology at Leipzig (1865-95). Ludwig was one of the most celebrated of modern physiologists, and expressed many original ideas on the subject in his *Lehrbuch der Physiologie des Menschen* (1852-56). Under his guidance the Physiological Institute at Leipzig became a centre of original scientific research second to none. He was the inventor of the mercurial blood-pump.

Ludwig, OTTO (1813-65), German dramatist, born at Eisfeld, Saxe-Meiningen. His first work, *Der Erbfürster*, appeared in 1853. This was followed by *Die Makabäer* (1855). One other notable work, a tale, *Zwischen Himmel und Erde* (1857), was all that he lived to finish and publish, though there appeared after his death *Shakespeare-Studien* (1871). His *Gesammelte Schriften* were published in 1891-2, and again in 1900 by Adolf Bartels.

Ludwigsburg, tn., Wurtemberg, Germany, 10 m. N. of Stuttgart; is the principal military depot of Wurtemberg. Has cannon foundry and arsenal; manufactures metallic wares, musical instruments, chemicals, cotton and woollen goods. Pop. (1900) 19,436.

Ludwig's Canal, canal, Bavaria, Germany, from Dietfurt on the Altmühl to Bamberg on the Regnitz, connecting the basins of the Danube and the Rhine.

Ludwigshafen, tn. in the Rhine palatinate, Bavaria, Germany, on the l. bk. of the Rhine, opposite Mannheim; has important manufactures of aniline dyes and soda, and does considerable trade in timber, iron, and coal. The chemical works are said to be the largest in the world. Pop. (1901) 61,900.

Luff, the order to the helmsman to put the tiller towards the lee side of a ship, in order to make her sail nearer to the direction of the wind.

Lugano, largest tn. of the Swiss canton of Ticino, on the N. shore of Lake Lugano (21½ m. long). Though politically Swiss, Lugano is Italian in every other respect. It is much frequented by visitors in spring and in autumn. Pop. (1900) 9,500.

Lugansk, or **LUGAN**, tn., Ekaterinoslav gov., S. Russia, 16 m. S.E. of Slavyanoserbsk, at the junction of the Olkhovaya and Lugan'. It has an important trade in grain, cattle, copper, and wool. There are iron, coal, and anthracite mines in the neighbourhood. The industrial establishments include iron foundries, blast-furnaces, cannon foundries, and engine shops. Pop. (1897) 20,419.

Luganskaya Stanitsa, tnshp. of Don Cossacks, in territory of the Army of the Don, S. Russia, 45 m. N.W. of Kamenskaya Stanitsa, on the Donets. Pop. (1897) 20,381.

Lugard, SIR FREDERICK JOHN DEALTRY (1858), African traveller and administrator, has seen active service in Afghanistan, Burma, the Sudan, and Uganda. He made terms with King Mwangi when acting for the British E. Africa Company, and established imperial interests in remote parts of W. Africa. He was commandant of the W. African Frontier Force, which he raised (1897-9), and is now (1905) high commissioner of N. Nigeria.

Lugdunum. See LYONS.

Lugdunum Batavorum. See LEYDEN.

Lugger, a small vessel having one, two, or three masts, upon each of which is set a square 'lugsail.' She may also carry topsails, and have a bowsprit on which are set one or more jibs. The lugsails of a lugger hang obliquely to the masts, their yards being slung at one-third of their length. Luggers sail close to the wind, and particularly well when close-hauled.

Lugo. (1.) Province, Galicia, N.W. Spain, an extremely mountainous district watered by the Minho, with a coast-line on Bay

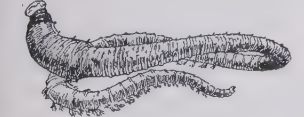
of Biscay. The slopes of ranges produce cattle and timber; the valleys abound in agricultural supplies and fibres. There are mines of copper and lead, and quarries of slate, granite, and marble. The province contains sixty-four townships, and its area is 3,814 sq. m. Pop. (1900)



Lugger.

465,386. (2.) City (anc. *Lucus Augusti*), cap. of above prov., on riv. Minho. There are many curious Roman remains, including the *thermae*, still much frequented in summer. Pop. (1900) 28,024. (3.) Town, Central Italy, prov. Ravenna, 17 m. w. of town of that name. Important annual fair (Sept.). Manufactures rope and furniture. Pop. (1901) 27,415. **Lugos**, chief tn. of co. Krassó-Szörény, S. Hungary, and an episc. see of the Greek Catholic Church, 37 m. E. by s. of Temesvár. Good wine is made. Pop. (1900) 16,100. **Lug Sail**. See SAIL AND RIGGING.

Lug-worm, or LOB-WORM (*Arenicola piscatorum*), a marine annelid or segmented worm which is greatly prized as food by many ground-feeding fish, and is in consequence valued as bait. It is a burrowing worm, going down to a depth of about two feet, and occurs in vast numbers on muddy shores between and beyond tide-marks. The food consists of organic particles mingled with the muddy sand, and the indigestible residue is thrown up at the surface in the shape of the familiar worm 'castings.' The animal is



Lug-worm.

cylindrical in shape, the anterior region being thickest, and sometimes reaches a foot in length. With the dark brown or green tint of the body the bright red gills contrast strongly. They number thirteen pairs, and are branched and treelike.

Lulk, Belgium. See LIÈGE. **Luines**, DUC DE. See LUYNES. **Luini**, BERNARDINO (c. 1470-c. 1535), Italian painter of the Lombard school, was born at Luino, on the Lago Maggiore. His work shows in a marked degree the influence of Leonardo da Vinci, to whom much of it was formerly ascribed. Many of his works are to be found in the churches and galleries of Milan, Saronno, and Lugano. He is one of the five painters for whom Ruskin claims 'supremacy' in his *Modern Painters*.

Luino, or LUVINO, tn., prov. Como, Lombardy, Italy, on the E. shore of Lake Maggiore, 22 m. N.W. of Como; has cotton-weaving and silk-spinning. Pop. (1901) 5,890.

Luise, AUGUSTE WILHELMINE AMALIE (1776-1810), queen of Prussia, daughter of Karl, Duke of Mecklenburg-Strelitz, was born at Hanover (1776), and married the prince-royal of Prussia, afterwards Frederick William III., in 1793. She particularly distinguished herself by her resolute conduct during the Napoleonic campaign, and the Prussian order of Luise was instituted in her honour. See Hudson's *Life and Times of Louisa, Queen of Prussia* (1874).

Luisia, a genus of tropical epiphytall orchids with dull-coloured flowers. A few of the species are cultivated, most commonly *L. platyglossa*, which is characterized by its hairy roots and its somewhat dingy purple flowers.

Luke, THE GOSPEL ACCORDING TO, the third book in the canon of the New Testament, often called the 'third gospel.' It presents a well-ordered account of the public ministry of Jesus, using both the Mark narrative and the Matthew *logia* (see LOGIA), but with considerable freedom, and employing independent sources for the birth and early years of Christ. (See GOSPELS.) The matter peculiar to Luke, both history and parable, is of the highest interest and value. Very ancient tradition identifies the author with Luke, 'the beloved physician,' the companion of the apostle Paul (Col. 4:14, etc.), and critics are at least agreed that he was one with the writer (or compiler) of the book of Acts. The assonances between the third gospel and Paul are striking—e.g. the use of the term 'justify' (18:14 and other four times; frequent in the epistles); forgiveness through faith (7:36-50); the universality of the gospel (10:25-37, 17:11-19): cf. also the almost identical phraseology in the account of the last supper (Luke 22:19 f.; 1 Cor. 11:23 f.). Professor W. M. Ramsay ranks

Luke as a historian of the highest qualities (*St. Paul*, etc.), and Renan speaks of the work as 'the most literary of the gospels.' See the commentaries by Meyer (trans.), later German edition by B. and J. Weiss, Godet, Plummer (*Internat. Crit. Com.*), Holtzmann (in *Hand-Com.*), Farrar (*Cambridge Bible*), Adeney (*Century Bible*).

Lukuja. See TANGANYIKA. **Lukut**, or SUNGI LUKUT, riv., British colony of Malacca, accessible to vessels drawing not more than 10 ft. of water. There is a trading village at its mouth.

Luleå, seaport and chief tn., co. Norrbotten, Sweden, on isle of Sandö, at mouth of Luleå; has trade in Gällivara iron ore, timber, tar, salmon, and reindeer hides. It is connected with Stockholm by a steamship line. Pop. (1901) 9,484.

Luleå, river of N. Sweden, rising in two sources near the lcty Sultelma (6,200 ft.), and after forming a series of lakes and many imposing waterfalls reaches the Gulf of Bothnia at Luleå. Length, 255 m.

Lull, RAMON (c. 1235-1315), Spanish Christian philosopher, known as 'the enlightened doctor,' born in Majorca, spent his life in preaching throughout Europe the truth of the gospel as proved by reason. To him were due the study of Oriental tongues in Oxford, Paris, Bologna, and other seats of learning, and the foundation of the Lullian school of rational Christianity. His principal works are *Ars Brevis* and *Ars Magna*. A collected edition of his works was published at Mayence (1721-42). See Helffing's *Raymond Lull* (1858), Canalejas's *Las Doctrinas del Doctor R. Lullo* (1870), and Zwemer's *Raymond Lully* (1902).

Lully, GIOVANNI BATTISTA (1633-87), the founder of French opera, was born at Florence, and taken in boyhood to Paris, where he became a member of the band of Louis XIV., who made him director of music to the royal family (1662), and later director of the Académie Royale de Musique (1672). In conjunction with Quinault, Lully composed numerous operas, and was equally successful whether writing in a light or in a serious vein. His most important compositions are *Alceste* (1674), *Thésée* (1675), *Persée* (1682), and *Armide* (1686).

Lully, RAYMOND. See LULL, RAMON.

Lumbago (Lat. *lumbus*, 'loin'). While most believe that lumbago is a rheumatic affection of the lumbar muscles and fascia, many authorities attribute it to rheumatism of the sacro-iliac ligaments and cartilages. True lumbago is sudden in its onset. The

patient, on attempting to rise from a stooping posture, has a sensation of being gripped across the loins, and is at first powerless to move. After a time, and with considerable pain, he can straighten his back, but he then finds himself unable to stoop. Lumbago is seldom accompanied by rise of temperature or by much disturbance of the general health, and at the end of an attack the pain and stiffness may disappear as suddenly as they came. Those who are subject to the condition should wear warm clothing, eat plentifully of good food, and avoid cold and damp. Cod-liver oil is also a prophylactic. During an attack a purge should be taken; and alkalis and aconite are beneficial, with large quantities of hot drinks, such as weak tea, to promote sweating. For this purpose hot-water baths and Turkish baths are also useful. As counter-irritants, mustard plasters and turpentine stupes may be applied to the back. In a severe attack, dry cupping is of service; and recently an old method of treatment has been revived—*viz.* acupuncture, one or more needles being thrust into the skin over the painful spot. This operation occasionally gives immediate relief, which may last for several hours. In slight attacks belladonna plaster soothes the pain.

Lumbering. The growing, felling, and preparing of wood for building purposes, shipbuilding, furniture manufacture, and a variety of other uses forms one of the most important industries of the United States, Canada, and of some European countries. The industry, especially in America, is well organized, and is subdivided into—(1) logging, which includes the felling, cutting in lengths, and transporting to the mill; (2) sawmilling of the logs into rough timber, beams, joists, boards, and lathes; and (3) the planing of these. In the northern states and in Canada lumbering is chiefly carried on in winter, and the logs are transported on sleighs over the icy roads. The chief wood-exporting countries are the United States, Canada, Austria, Norway, Sweden, and Russia; Great Britain and Germany being the largest importers. See FORESTRY, TIMBER.

Luminescence is the term applied to those cases in which a body gives out light without being hot. There are many varieties of this phenomenon. Thus, it may be set up by chemical action, such as the glow of phosphorus or of the fire-fly; or it may be caused by the action of both visible and invisible light, as in the case of the fluorescence of quinine solutions or the phos-

phorescence of luminous paint. Electric discharges are also a fruitful source of luminescence, causing it either by the bombardment of electrified particles, their disintegration, or by the radiations, such as X-rays, set up in the process. Cases of this action are observed in the luminosity of the gases and glass of vacuum tubes, and the fluorescence of screens coated with substances such as barium platinocyanide; whilst the similar effects produced by radium itself, or by the action of radium rays, on these screens, on diamonds, and on zinc blende, are probably ascribable to similar causes. Luminescence is also caused by friction, as when sugar is crushed; by heating, as when fluorspar is dropped on a hot plate; and in other ways.

Luminosity (intrinsic) is the amount of light emitted per unit of area of a shining body. It is due in most cases to the body being hot, an object becoming visible in the dark when between 400° and 500° C., bright red at about 900° C., and white at 1,200° C. approximately. Most of the luminous bodies that owe their light to incandescence are in the solid state. This is obvious in the case of the incandescent gas lamps, in the lime light, and also in the electric arc, from which most of the light is emitted by the glowing ends of the carbon rods, but little coming from the intervening carbon vapour. Flames of burning hydrocarbons, as of coal gas or candles, also owe their luminosity to the incandescent solid particles of carbon set free from the compounds present; but in other cases, such as that of oxygen and hydrogen burnt under pressure, where solid particles cannot be present, and possibly in the case of burning hydrocarbons also, dense gases play a similar part. (See FLAME.) In comparing luminosities, the eye is not proportionally sensitive to the amount of light emitted. Thus, a surface giving out a hundred times as much light as another only appears about five times as bright. This difficulty is overcome by arranging the two sources at such distances as to equally illuminate areas in juxtaposition (equal luminosities being accurately comparable), when, in accordance with the law of inverse squares, light emitted by the two sources is in proportion to the square of their distances from the illuminated surfaces. Serious difficulties, however, are introduced if the lights are of different tints, and the standards are by no means entirely satisfactory. See PHOTOMETRY and LUMINESCENCE.

Luminous Paint contains materials that become luminescent

and throw out a feeble glow of different tints for some time after it has been exposed to sunlight, or other light rich in ultra-violet rays. The earliest of these substances was 'Bologna phosphorus,' which consisted of impure barium sulphide, obtained by heating barium sulphate with carbon. Canton's phosphorus, which is calcium sulphide similarly prepared, and the corresponding strontium sulphide, also act in the same way, the effect produced being largely dependent on the presence of traces of other substances, such as manganese or bismuth. Balmain's luminous paint is stated to contain the latter element along with calcium sulphide.

Lumpsucker (*Cyclopterus lumpus*), a clumsily-built fish, common off the coasts of Scotland, N. Europe generally, and N. America. Its southern limit is the Bay of Biscay. The body is massive, and marked with tubercles and longitudinal ridges; the first dorsal fin is buried in a fleshy ridge in the back, while the ventral fins form a powerful sucker; the tail is short, and the



Lumpsucker.

fish is a poor swimmer, but it possesses the power of attaching itself firmly to rocks by means of the sucker. The breeding habits are interesting, for the male watches over the egg mass for several weeks. The lumpsuckers are bony fish, belonging to the family Discoboli.

Lumsden, SIR HARRY BURNETT (1821-96), British soldier, was quartermaster and interpreter to native troops in Afghanistan (1842); commandant at Peshawar (1849), and was at Kandahar and Kabul during the Indian mutiny (1857-9). A born leader, he raised (1847), organized, and commanded the 'Queen's Own Corps of Guides,' which afterwards became a distinguished Indian regiment. See Lumsden and Elsmie's *Lumsden of the Guides* (1899).

Lunacy and the Lunacy Laws. 'A lawyer, when speaking of insanity,' says the late Mr. Justice Stephen, 'means conduct of a certain character; a physician means a certain disease, one of the effects of which is to produce such conduct.' A lunatic comes into relation with the law—(1) when he suffers from such unsoundness of mind that it is



Lumbering Scenes.

1. Timber-hauling on a corduroy road, Canada. 2. A Canadian lumber camp. 3. Straightening out a jam of logs, Lake Kippewa district.
 4. Towing boom of logs to mill, Canada. 5. Life on a lumber raft, Ottawa R. (Photo by Notman.) 6. Timber rafts on the Isar, Bavaria.
 7. Lumber barges at Ottawa. (Photo by Notman.) 8. A giant log at Royal City Sawmills, New Westminster, British Columbia. (Photo by Notman.)

necessary for his own or the public welfare that his liberty be restricted; (2) when he is incapable of managing himself or his affairs, or of directing their management; and (3) when a plea of insanity is entered on his behalf in answer to a criminal charge. The legal view of insanity is thus much more limited than the medical, since it includes only questions of life or property, competency and responsibility, and ability to transact the affairs of life. According to the law of England, the modern view is that whether a person is or is not a lunatic is in every case a question of fact. He may suffer from delusions, but be quite capable of making a will. His contracts are good, unless to the knowledge of the other party he was incapable of understanding what he was doing. He is criminally responsible for his actions, unless from defective mental power or from mental disease he cannot understand the nature of his acts, or does not know his act is wrong, or is unable to control his conduct—unless, in the last case, his want of control arises from his own fault.

In England lunatics are governed by the Lunacy Acts, 1900 and 1901. They may be received in (1) houses licensed by the Lunacy Commissioners, if within seven miles of London, and by the justices in quarter sessions elsewhere; (2) hospitals, which are places supported by voluntary contributions, and must be registered by the commissioners; (3) county or borough asylums for pauper lunatics. The councils of all administrative counties and county boroughs, and of certain other boroughs mentioned in the 4th schedule to the Lunacy Act, 1890, are bound to provide asylums for the requirements of their areas. A lunatic may be received into a licensed house for not more than seven days on an urgency order, which is an authority given generally by a relative, and accompanied by a medical certificate authorizing the detention on the ground of urgency. But in ordinary cases a reception order is made by a county court judge, stipendiary magistrate, or specially appointed justice, on a petition by a relative of the lunatic, and a certificate by two medical men. A reception order is good for one year from its date, but can be renewed on a medical certificate. Orders for the discharge of a patient may be made by the person who petitioned for his detention, or by a visitor, or by the commissioners, and even a stranger can obtain an order for the special medical examination of a lunatic, with the leave of the commissioners. All lunatic asylums must be con-

stantly visited without notice. The acts contain special provisions as to lunatics in private families, and lunatics kept singly as patients.

There are ten commissioners in lunacy, four unpaid and six paid, of whom three are legal and three medical, appointed and removable by the lord chancellor. All lunatic asylums, public and private, are under their supervision and control.

The judge in lunacy and the masters in lunacy have the widest powers in respect of the management of a lunatic's property, in cases where the lunatic (1) has been so found by inquisition—i.e. where a formal inquiry by a master in lunacy, generally with a jury, has been held into the lunatic's state of mind; (2) is lawfully detained; (3) is incapable of managing his affairs, and this is proved to the judge in lunacy; (4) has less than £2,000 of property, and is proved to be a lunatic. When a person is found a lunatic by inquisition, the judge in lunacy appoints a committee of the person, who is responsible for the lunatic's comfort; and a committee of the estate, who is responsible for the management of his property. Criminal lunatics are governed by the Criminal Lunatics Act, 1800, the Criminal Lunatic Asylums Act, 1860, and the Criminal Lunatics Act, 1884. Asylums may, from time to time, be provided for the exclusive use of criminal lunatics. In England, criminal lunatics are detained at Broadmoor; in Ireland, at Dundrum; and in Scotland, at Perth Penitentiary.

In Scotland lunatics are treated under the Lunacy (Scotland) Acts, 1857 and 1887. The procedure as to the reception and detention of lunatics is practically the same as in England. The sheriff is the judicial authority, and an urgent case is received into an asylum upon an emergency certificate, which is valid for only three days. The supreme administrative authority is the Board of Lunacy for Scotland, consisting of one unpaid and two paid commissioners. The office of the board is in Edinburgh. The property of lunatics in Scotland is simply and inexpensively managed by being placed in charge of a *curator bonis* appointed by the court. In Ireland the lunacy laws are similar to those of England. See also *INSANITY*, and Archbold's *Lunacy* (4th ed. 1895), and Wood Renton's *Law of and Practice in Lunacy* (1889).

Lunardi, VINCENZO (1759-1806), Italian aeronaut, secretary to the Neapolitan embassy, London, was one of the first to make a balloon ascent in England (1784). His balloon was 33 ft. in

diameter, and inflated with gas produced from zinc and sulphuric acid. After an eight hours' journey from Moorfields, London, he descended safely near Ware.

Lunaria. See *HONESTY*.

Lunawara, or LUNAWADA, cap. of state of same name, in Rewakanta, Gujarat, India, 65 m. E. of Ahmadabad. Pop. 10,000.

Lund, city, co. Malmöhus, Sweden, on the Höjeå. In the middle of the city is the cathedral, the finest Romanesque building in Scandinavia (consecrated 1145); the old university, now the library; the new university, built 1878-82; and the botanic garden. Lund has a few industries—gloves, furniture, and iron-smelting. Here in 1676 Charles XI. defeated the Danes, and at Lund the peace of 1679 was signed. Pop. (1901) 16,900.

Lund, TROELS FREDERICK (1840), Danish historian, historiographer royal and professor at the military school of Frederiksborg, has published important works on Scandinavian history, including *Historiske Skitser efter utrykte Kilder* (1876), *Danmarks og Norges Historie i Slutningen af det 16 Aarhundrede* (1879-91), and *Das Tägliche Leben in Skandinavien* (1882).

Lunda, extensive territory of Central Africa, lying S. of the Congo Free State, between the Kwango in the W. and the Luabala in the E. It is drained mainly by the Kasai and its l. bk. tributaries. Formerly a Bantu empire ruled by the hereditary Muata Yamvo, it is now divided between Portuguese W. Africa and the Congo Free State.

Lundenburg, tn., S. Moravia, Austria, on the Thaya, 30 m. S.E. of Brünn. It was formerly the Moravian capital. Pop. 6,776.

Lundy, small isl. lying off Barnstaple Bay, N. Devon, England, 11½ m. N.N.W. of Hartland Point. Pop. about 100. It has a lighthouse, and possesses ruins of remarkable towers, attributed to its De Marisco lords (c. 1100-1321), who owned the island concurrently with the Templars.

Lüneburg, tn., Prussian prov. of Hanover, Germany, on the Ilmenau, a tributary of the Elbe; has several historic churches and public buildings dating from the 14th and 15th centuries. Manufactures include chemicals, iron wares, and carpets. Large quantities of gypsum and salt are mined. Pop. (1900) 24,693.

Lunel, tn. in dep. Hérault, S. France, 14 m. E.N.E. of Montpellier; has trade in wines, brandy, and cattle. Pop. (1901) 7,532.

Lunenburg, seapt. tn., in S. of Nova Scotia, British N. America, the co. tn. of Lunenburg co. Industries are fishing and shipbuilding. Pop. (1901) 2,916.

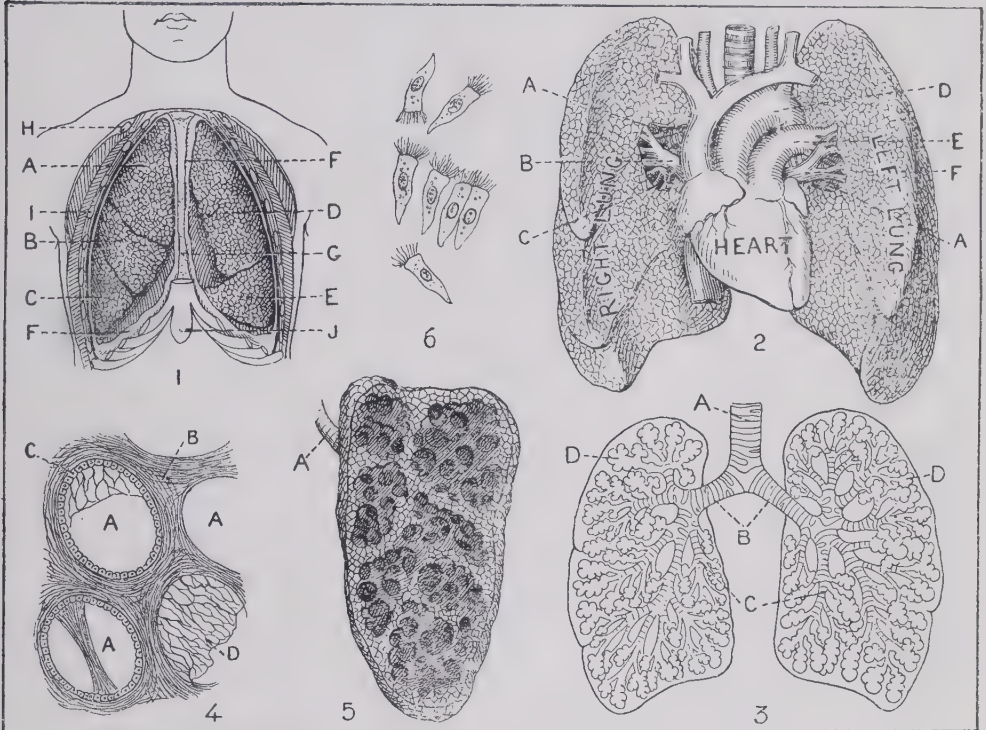
Lunette. (1.) A small vaulted aperture built in a large vaulted roof to admit light, examples being afforded by the upper lights in the nave of St. Paul's Cathedral. (2.) In fortification, a detached work with flanks or lateral wings built for the protection of roads and bridges.

Lunéville, tn., dep. Meurthe-et-Moselle, France, on Meurthe R., 18 m. S.E. of Nancy. The principal products are faience, linen, cotton, silk, hosiery, glass, leather, and gloves. The peace of Lunéville was signed here in 1801. Pop. (1901) 23,269.

phibians, the original cavity of the outgrowth becomes largely filled up by a spongy network, which greatly increases the surface available for purposes of respiration, and gives to the organ its characteristic appearance. Lungs have apparently originated from the air or swim bladder of a fishlike form, and thus afford an example of an organ which was primitively hydrostatic, and has secondly acquired a respiratory significance. In the Dipnoi the swim-bladder is both functionally and structurally a lung, and is more

the thorax, instead of being free as in mammals, and are not capable of great expansion. They are, however, remarkable in communicating with an elaborate system of air-sacs, nine in number, which lie within the body-cavity, and are connected in their turn with other air-spaces within the bones, beneath the skin, and so on. In mammals generally the lungs resemble those of man.

Anatomy.—The lungs are the principal organs of respiration, and are situated in the thoracic cavity. In colour they are pinkish gray mottled with black, and



The Lungs.

Fig. 1. Human thorax, anterior wall removed, showing lungs in position: right lung—A, superior lobe; B, middle lobe; C, inferior lobe; left lung—D, superior lobe; E, inferior lobe; F, F, pleura; G, mediastinum; H, clavicle; I, ribs; J, sternum. **Fig. 2.** Lungs, spread out; A, A, bronchi; B, right pulmonary vein; C, right pulmonary artery; D, arch of aorta; E, left pulmonary artery; F, left pulmonary vein. **Fig. 3.** Diagrammatic scheme of the lungs: A, base of trachea; B, bronchi; C, bronchial tubes; D, air cells (alveoli). **Fig. 4.** Alveoli: A, A, alveoli; B, elastic trabeculae; C, epithelium; D, alveolar wall with capillaries. **Fig. 5.** Lung of reptile (tortoise): A, trachea. **Fig. 6.** Cells of ciliated epithelium.

Lung-chau, tn., Kwang-si, China, near the Tong-king frontier, opened to trade with the French colony in 1889. Pop. estimated at 20,000.

Lungs.—*Comparative.*—The lungs are hollow outgrowths from the anterior part of the alimentary tract, the proximal narrow portion of the outgrowth forming the windpipe or trachea. They form the characteristic respiratory organs of the air-breathing vertebrates. Except in some am-

phibians, the original cavity of the outgrowth becomes largely filled up by a spongy network, which greatly increases the surface available for purposes of respiration, and gives to the organ its characteristic appearance. Lungs have apparently originated from the air or swim bladder of a fishlike form, and thus afford an example of an organ which was primitively hydrostatic, and has secondly acquired a respiratory significance. In the Dipnoi the swim-bladder is both functionally and structurally a lung, and is more

in shape each is conical, the apex lying in the root of the neck, while the concave base rests upon the diaphragm. They communicate with the external air by the trachea or windpipe, which bifurcates to form a right and a left bronchus, each of which divides and subdivides throughout the entire lung. The right lung is the larger and heavier, and is divided into three lobes—upper, middle, and lower. The left lung has only two lobes, and is narrower

than the right on account of the position of the heart, which lies between the two lungs, but inclines to the left side.

Externally each lung is covered by a double serous sac, the pleura. The outer surface of the outer layer of the pleura is adherent to the chest wall, and is called the parietal, or sometimes the costal layer; while the inner surface of the inner layer is closely adherent to the lung, and is known as the visceral or pulmonary layer. The inner surface of the parietal and the outer surface of the visceral layers are smooth and glistening, so that one can glide over the other during the movements of respiration. The interspace between the two layers is called the pleuritic cavity, but in health the two smooth surfaces are separated only by a little serous fluid, which acts as a lubricant.

The bronchi are circular cartilaginous tubes, which by successive subdivisions diminish until their diameter is only about one-fortieth of an inch, when they lose their circular form, and terminate in irregular passages, on the sides of which are the small air-sacs known as alveoli. The walls or septa between neighbouring alveoli contain much delicate elastic tissue, and carry the pulmonary capillaries, which are distributed in a very fine network with meshes smaller than the vessels themselves. The blood is thus spread over the alveolar walls in a thin layer, and is separated from the air contained in the alveolus only by the delicate capillary wall and the equally delicate epithelial cells which line the alveolus. All the alveoli communicate directly with the bronchioles, or ultimate divisions of the bronchi.

The blood supply to the lungs is double, one set of vessels, the bronchial, being nutritional, while the pulmonary vessels are concerned with the process of respiration, and are therefore functional, since they circulate through the lungs the blood whose purification is the province of the breathing organs. The bronchial arteries are comparatively small. Springing from the thoracic portion of the aorta they accompany the bronchial tubes, and supply with arterial blood the lung tissue and bronchial glands as well as the bronchi themselves. The pulmonary artery is a large vessel which carries impure blood from the right ventricle of the heart. Like the trachea, it bifurcates, and the right and left divisions pass to their respective lungs with the bronchi which they accompany, dividing and subdividing in similar fashion until they terminate in the dense capillary network

round the alveoli. The pulmonary blood, after being purified in the alveolar capillaries, returns to the heart by four pulmonary veins. The pulmonary lymphatics are numerous. The pulmonary nerves arise from plexuses, which are chiefly formed by branches from the vagi and from the sympathetic system.

Physiology.—All living cells require oxygen for their nourishment, and for the continuance of life the blood must constantly renew its supply of oxygen, and at the same time part with the carbon dioxide which it has washed out of the tissues. The red cells of the blood are the carriers of oxygen, which unites temporarily with the hæmoglobin contained in these cells, and gives arterial blood its characteristic bright red colour, venous blood being dark and purplish. In pulmonary respiration the act of inspiration is effected by enlargement of the thoracic cavity, through the muscular contraction of the diaphragm and the intercostal muscles which stretch from rib to rib. The lungs play a passive part in inspiration. Being practically elastic bags, they follow the retreating chest walls and floor, with the result that air is drawn in through the trachea. In the expiration of ordinary breathing, the diaphragm and intercostals being relaxed, the elasticity of the lung causes it to contract, and drives out some of the contained air. In ordinary breathing about 30 cub. in. of tidal air pass in and out of the adult lung at each respiration, but an additional 100 cub. in. of supplemental air can be expelled by forced expiration. There remains about 100 cub. in. of residual air, which no effort can drive out of the lungs. At the end of ordinary inspiration the lungs thus contain about 230 cub. in. of air, to which a further 100 cub. in. of complementary air can be added by a deep-drawn, prolonged inspiration. In ordinary breathing the tidal air is only about one-eighth of the total contained in the lung, the remaining seven-eighths being stationary. Expired air differs from inspired in being warmer, moister, and in having about 5 per cent. more carbon dioxide and 5 per cent. less oxygen. About 400 cub. ft. of air pass through the lungs of an adult in twenty-four hours, in which time about 9 oz. of water and 8 oz. of carbon in the form of carbon dioxide are exhaled. In ordinary breathing the respiratory act occurs about eighteen times per minute, but exertion and exposure to cold accelerate the breathing, and at the same time hasten the movements of the heart, so that a greater volume

of blood is poured through the lungs per minute. The nervous centre for respiration is situated in the medulla oblongata, and appears to be chiefly stimulated by venous blood. Until recently deficiency of oxygen was believed to stimulate the centre, but it is more probable that the active agent is free carbon dioxide in the blood which bathes the nerve cells. When the blood, therefore, is sufficiently charged with carbon dioxide to irritate or stimulate the respiratory nerve cells, or to paralyze controlling cells which inhibit them, impulses are transmitted to the inspiratory muscles, whose contraction replaces the excess of carbon dioxide by a fresh supply of oxygen. Other stimuli, however, act upon the centre; thus cold water dashed upon the chest causes strong involuntary inspiration, and within certain limits both inspiration and expiration are under voluntary control.

Pathology.—Most of the diseases of the respiratory apparatus are described in special articles. (See ASTHMA, BRONCHITIS, CIRRHOSIS, EMPHYSEMA, PHTHISIS, PLEURISY, PNEUMONIA.) Injuries of the lung are most frequently due to penetrating wounds of bullets or of cutting instruments, but not uncommonly the ragged end of a broken rib lacerates the underlying lung. In all such cases there is risk of air getting into the pleural cavity, either from the wound in the chest wall or from that in the lung. Air in the pleural cavity (pneumothorax) is generally accompanied by a certain amount of fluid. Should the fluid be serous, the condition is known as *hydro-pneumothorax*, while a mixture of air and pus is called *pyo-pneumothorax*. *Gangrene* of the lung is a rare disease, and usually occurs only in the debilitated. *Abscess* may be primary, and may follow a wound or suppurative disease in a neighbouring organ; thus, an abscess of the liver may perforate the diaphragm and lead to abscess of the lung. More common, however, are multiple abscesses due to such a disease as pyæmia. Various circulatory derangements affect the lungs. *Active congestion* is usually associated with other diseases, such as pneumonia. *Passive congestion* may be obstructive, and is common in disease of the left side of the heart; or it may be hypostatic, when from general debility the posterior and basal parts of the lungs become engorged with blood and serum. A not uncommon condition, known as *pulmonary apoplexy*, or *hæmorrhagic infarct*, results from the blocking of a branch of the pulmonary artery.

Diseases of the lungs are char-

acterized by four leading symptoms—pain, interference with breathing, rise of temperature, and cough. While pain is present in most pulmonary affections, it varies in severity and in character. In bronchitis it may only amount to a raw, burning sensation in the trachea, while in pleurisy it has a stabbing character from the friction of the inflamed membranes against each other at each breath. In phthisis and pneumonia the pain is due to associated pleurisy, the inflammatory process sooner or later affecting the surface of the lung. The interference with the breathing also varies in type. The respiration may be accelerated, or a condition of dyspnoea—i.e. difficult breathing—may be produced. When in struggling for breath a patient is compelled to adopt a sitting posture, he is said to have *orthopnoea*. Rise of temperature occurs in most pulmonary diseases, and is apt to be higher in children than in adults. A cough is an explosive effort, produced after a deep inspiration, by suddenly opening the vocal cords against which air has been compressed by the expiratory muscles, the diaphragm being relaxed. In bronchitis the cough is often wheezy, and the sputum is generally frothy mucus mixed with pus, though after severe fits of coughing a little blood may be present. In pneumonia the cough is attended by pain of the stabbing, pleuritic character, and the patient tries to suppress it. The sputum is generally gelatinous, sticky, and of a plum colour, which gradually becomes rusty brown as the patient progresses towards recovery. In phthisis the cough varies with the state of the disease. It may be painful and violent, but many patients with phthisis suffer little from cough. The expectoration may be nummular (i.e. in disc-like purulent masses) or hæmorrhagic.

Lungwort, a name given to members of the genus *Pulmonaria*, a division of the order Boraginaceæ. They bear terminal cymes of bluish flowers, with tubular five-cleft calyces and funnel-shaped corollas. *Pulmonaria officinalis* was at one time used as a cure for lung diseases. It is a somewhat rare British native. Other species are *P. angustifolia*, the blue cowslip, and the pink-flowered *P. saccharata*.

Lunn, HENRY SIMPSON (1859), editor of *Travel*, born at Horncastle, Lincolnshire; graduated M.B. at Dublin University, and was for some time a medical missionary in India. In 1892 he founded the Grindelwald Conferences for the consideration of Christian unity, from which scheme he developed popular tours, characterized by educa-

tional elements, such as lectures from distinguished men on the places visited. Recently Dr. Lunn has taken an active part in the organization of the Free Church Federation, and is an original founder of the Liberal Forward Movement.

Lupercalia, the festival of the god Lupercus at ancient Rome (the name signifies 'wolf festival'); it was in origin a festival of the shepherds, and was held on the 15th of February every year in the Lupercal on the Palatine Hill, a place which contained an altar and grove sacred to the god. Here the *Luperci*, or priests of Lupercus, on the day of the festival, sacrificed goats and young dogs; and, after various ceremonies, cut up the goat skins, part of which they put on their own bodies, and part they made into thongs, with which they ran through the streets of the city striking all whom they met. Women courted their blows, believing that they caused fertility. Mark Antony, when consul, acted as one of the *Luperci*. See Marquardt and Mommsen's *Handbuch der Römischen Alterthümer* (1871-82); and Murray's *Manual of Mythology* (1873).



Lungwort (Pulmonaria officinalis).

1, Corolla (opened).

Lupine, a genus of leguminous plants, mostly natives of America, many of which are valued as hardy herbaceous plants in our gardens. The flowers are generally blue or purple, and are most commonly borne in terminal racemes or whorls. The leaves are usually of great beauty, being digitately manyfoliated. Our garden lupines are mostly hybrids.

Among the species are *L. polyphyllus*, a tall-growing perennial, bearing dark-blue flowers; *L. luteus*, a yellow-flowering annual; *L. mutabilis*, white and blue, almost a shrub in habit; *L. nanus*, a Californian dwarf-growing annual, with bluish flowers in summer; *L. subcarneus*, a dwarf-growing perennial with downy stem, and deep-blue flowers marked with yellow; and *L. nootkatensis*, a variegated-flowered perennial, with hairy leaves. Lupines are easily grown from seed in ordinary garden soil.

Lupton, THOMAS GOFF (1791-1873), English engraver, was one of the engravers employed by Turner on the *Liber Studiorum*, and also executed plates for *The Harbours of England* (1856), the letterpress being contributed by Ruskin. Notable plates by him are *The Infant Samuel*, after Reynolds, and *The Eddystone Lighthouse*, after Turner. Lupton was the first to substitute steel for copper in mezzotint engraving.

Lupulin, the fine yellow resinous powder secreted by the membranous scales which make up the bulk of the catkin of the hop, *Humulus lupulus*. See Hops.

Lupus (Lat. *lupus*, 'a wolf') is a term applied to a group of chronic skin diseases characterized by cortical overgrowth followed by ulceration. The cause is now recognized to be tubercular infection of the skin. The disease generally commences as a dull red translucent tubercle, or group of tubercles, raised above the surface and gradually increasing in area. The disease is most common in children and females. Until comparatively recent years lupus was almost incurable. Koch's tuberculin has been used with excellent results, and more recently X and other light rays have achieved even greater success. Much of the credit of the method of treatment by light rays is due to Finsen, the Danish doctor.

Lupus, an ancient southern constellation east of Centaur. Alpha Lupi is a helium star of 2.9 magnitude; γ , ϵ , λ , μ , π , and U A 103 Lupi are all closely double; while β Lupi is a spectroscopic binary.

Luray, t.n., cap. of Page co., Virginia, U.S.A., 76 m. s.w. of Washington, is renowned for its beautiful stalactitic cavern, discovered in 1878. The town has mineral springs, a tannery, and flour mills. Pop. (1900) 1,147.

Lurcher, THE, a cross between the greyhound and a sheep dog, and is essentially a poaching animal. Gifted with wonderful instinct, of the keenest sight, scent, and hearing, it enters into the

avocations of its master with a perfect knowledge of the duties required of it. It runs with its head low, sneaks along hedges, and is absolutely silent, answering to a motion of the hand, and carrying out its allotted task with the intelligence a sheep dog displays in folding sheep. There are no registered 'points' for a lurcher, and the Kennel Club does not include it as a recognized variety.



Lurcher.

Lurgan, tn., Co. Armagh, Ireland, 20 m. S.W. of Belfast, and 3 m. S. of Lough Neagh; manufactures linens, chiefly cambric, diaper, and lawn. Pop. (1901) 11,782.

Luria, or **LORIA**, ISAAC (1534-72), one of the famous 'Five Sages' of the 16th century, chief rabbi of Lublin, was born at Jerusalem. His works are of importance on account of the numerous notices they contain connected with the history of Jewish literature. His *Hokhmah Shelomoh* discussions on the Babylonian Talmud, Rashi, and the Tosaphoth is now an integral part of the Talmud editions.

Lusatia, or **LAUSITZ**, region between the Oder and Elbe, and consisting of Upper and Lower Lusatia. It originally belonged to Bohemia (1319), but in 1635 was taken by Saxony, with whom it remained till the Congress of Vienna (1815), when Lower Lusatia and part of Upper Lusatia were ceded to Prussia.

Lushai hills, wild and imperfectly explored tract of country on the N.E. frontier of Assam, India, occupied by a tribe known as Lushais, a warlike race who are a branch of the Kuki family. In 1890 their country became British territory.

Lu-shun-kau. See **PORT ARTHUR**.

Lusignan, tn., dep. Vienne, France, on river Vonne, 15 m. S.W. of Poitiers; possesses a fine 11th-century church. The Lusignan family furnished kings to Jerusalem and Cyprus during the crusades. Pop. (1900) 2,139.

Lusitania, originally the name of the territory of the ancient Spanish tribe the Lusitani. In this sense it covered the country between the rivers Tagus and Durius (Douro), as far E. as the frontier of Portugal. The Roman province of Lusitania roughly corresponded with the modern Portugal. The chief town of the Lusitani was Olisipo (Lisbon),

but Emerita Augusta (Merida) was the Roman capital. See Mommsen's *Hist. of Rome* (Eng. trans. 1894), and his *Provinces of the Roman Empire* (Eng. trans. 1886).

Lussin, or **LOSSINI**, isl. of Austria, in the Gulf of Quarnero, Istria, about 44½° N. lat. Area, 70 sq. m.; and pop. (1900) 11,615. Chief town, Lussin Piccolo (pop. 7,207); has a good harbour, and is visited as a summer resort.

Lustre, in physical optics, is a characteristic appearance of certain substances when viewed in ordinary light. Thus, there is the metallic lustre possessed by most, though not all, metals. The most characteristic are gold, silver, platinum, nickel, and aluminium. Each has its own lustre, by which it may be distinguished. The effect depends upon the manner in which the incident light is partly absorbed and partly sent back after a slight penetration into the surface layers. What it exactly consists of is not clearly understood. In pearly lustre, again, we have to deal with a peculiar surface condition, producing to a marked extent the phenomenon of diffraction. The nature of the diffraction in the two rays by which the eyes of the observer see any portion of the surface will differ somewhat; and to this difference in the two simultaneous sensations will correspond some physiological effect. In the case of transparent or translucent bodies, like precious stones and crystals generally, the lustre must be largely conditioned by the refractive power of the substance.

Lustrum ('a lustre') properly means a purification; in particular the purification of the whole Roman people, which took place on the completion of the census. As this occurred every fifth year, the term *lustrum* came to mean a period of five years. The *lustrum* was said to have been instituted by Servius Tullius (566 B.C.). The last *lustrum* took place 74 A.D. See Marquardt and Mommsen's *Handbuch der Römischen Alterthümer* (1871-82).

Lute, a stringed instrument of Asiatic origin, popular for centuries, but now obsolete in Europe, though music for the instrument was published so late as 1760. The lute resembled the present form of mandoline in having a pear-shaped convex back built up of staves of various kinds of wood, a flat breast—usually of pine—a bridge, a fretted finger-board, and strings tuned in pairs of unisons; but it differed from the mandoline in having from one to three sound-holes in the breast, in being sounded by plucking the strings with the thumb and fingers instead of striking them with a plectrum, and in having

in some forms additional strings which were not fingered, but only sounded the notes to which they were tuned. The strings varied in number, according to the type and size of the instrument. The archlute, chitarrone, and theorbo were all large forms of double-necked lutes, having the neck extended to contain another set of pegs regulating unstopped strings which ran alongside and not above the finger-board. Music for the lute was written in a form of notation termed 'tablature.'



Lute.

Lutes are cements used for making the joints of certain apparatus air-tight. Innumerable formulæ for such compositions are extant, and differ according to whether the joint requires to be heated, to withstand pressure, or to be readily undone. Linseed meal and water, whiting and linseed oil (putty), and red or white lead and linseed oil, are examples of lutes that will not stand heat; whilst Stourbridge clay and water and fire-clay and sodium silicate solution will resist its action. See **CEMENT**.

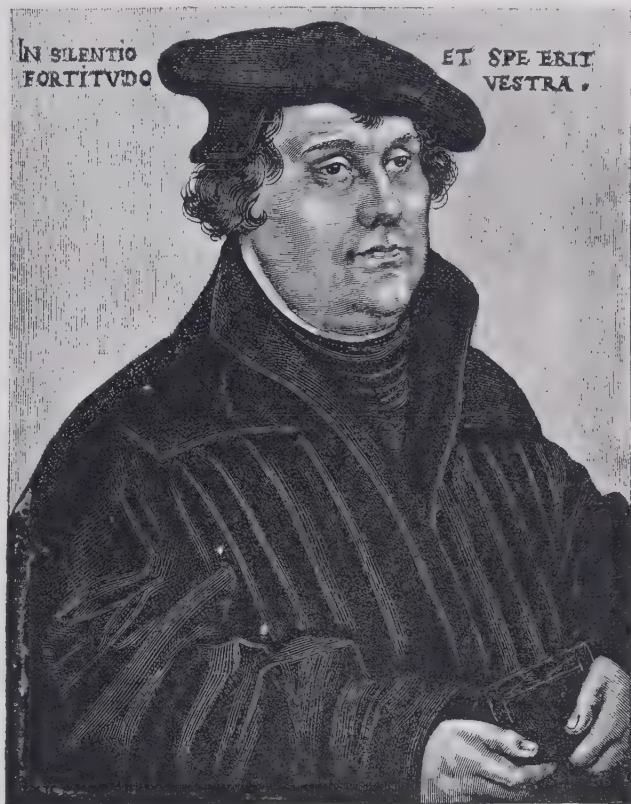
Lutetia, or in full **LUTETIA PARISIORUM**, 'the city of the Parisii,' was the ancient name of Paris, France.

Luthardt, **CHRISTOPH ERNST** (1823-1902), Lutheran theologian, was born at Maroldweisach, Franconia, and became professor at Marburg (1854), and two years later at Leipzig, where he died. His works display a clear and well-informed mind, and have enjoyed a vast popularity. The most important are his *Apologie ... des Christentums* (1864-80; Eng. trans.), *Das Johanneische Evangelium* (1852-3; Eng. trans.), *Die Lehre von den letzten Dingen* (1861), *Kompendium der Dogmatik* (1865), besides many volumes of *Predigten*. He also edited the *Allgemeine Evang.-Luther. Kirchenzeitung* (with the *Theol. Literaturblatt*), and the *Zeitschrift für Kirk. Wissenschaft u. Kirk. Leben*. See his autobiography, *Erinnerungen aus Vergangenen Tagen* (1889).

Luther, MARTIN (1483-1546), the leader of the Protestant reformation in Germany, was the son of Johann Luther, originally a peasant-proprietor at Möhra, near Eisenach, Thuringia, who migrated to Eisleben, in Saxony, where the reformer was born on St. Martin's Eve (November 10). In 1497 Martin was sent to a Franciscan seminary at Magdeburg, and in the following year to Eisenach. In 1501 he took residence at the University of Erfurt, as a student of law, read widely in the classical and scholastic authors, and gained his bachelor's and master's degrees in 1502 and 1505 respectively. The death of a young friend, and the experience of a dreadful storm, acting on a self-distrustful heart, weaned him from jurisprudence, and for peace of soul he entered the convent of the Augustinian monks at Erfurt, July 17, 1505. In the convent he submitted to the most stringent discipline, and in course of time resumed his reading, pondering especially over the fathers and the Bible; but in spite of fasts, vigils, and unremitting industry, he failed to gain the peace of mind he craved for, and fell into a state of morbid melancholy. From this he was eventually delivered through the sympathy of Staupitz, vicar-general of the German Augustinians, and, coming to better views of the divine mercy, was ordained priest in 1507. He left Erfurt in 1508 for a chair in the newly-founded University of Wittenberg, though he still remained a monk and lived in a cell, and here his preaching began to attract attention. In company with John of Meckeln he made a journey to Rome in 1511, and had his eyes opened to the degrading evils which underlay the specious piety of the church. Returning in 1512, he took his degree of doctor of theology, and henceforth his approach to the stage of publicity was rapid. His expositions of the Bible were listened to by students from all parts; his study of Augustine and the mystics, but especially his use of plain, nervous, vernacular speech gave a fresh and striking tone to his discourses. He began to publish, and in 1516 he became superintendent of eleven Augustinian convents. About this time there came to the Wittenberg district the Dominican monk Tetzel, selling pardons and releases from purgatory, in accordance with the indulgence issued by Pope Leo x. Luther refused to absolve some of Tetzel's customers; but as the chicanery continued, he took the decisive step of nailing to the church door at Wittenberg his ninety-five theses in Latin, as a public protest against the Pope's emissary. This was on October 31,

1517, which may thus be reckoned the birthday of the reformation. Copies of the theses were circulated, bought, and read everywhere; the movement towards the purer teaching proceeded apace, and the sales of the indulgence-mongers declined. The news of all this reached the Pope through the archbishop of Mainz, the patron of Tetzel; and Luther, still regarding himself as a true son of the church, sent his *Resolutiones* (a defence of his theses) to the church's head. Urged by

Carlstadt to silence, and so far succeeded with Luther as to force him into a position of more accentuated opposition to Rome. The chief result of the debate was Luther's publication of the famous treatises *An Address to the Nobility of the German Nation*, *On the Liberty of the Christian Man*, and *The Babylonian Captivity of the Church* (1520), which won to his side men like Ulrich von Hutten (Melancthon had already joined him) and practically all the patriotism



Martin Luther.

the Dominican Mazzolini, the Pope summoned Luther to Rome; but in deference to the wishes of the Elector Frederick of Saxony and the emperor, the place of rendezvous was changed to Augsburg (1518), where the papal legate Cajetan, after vainly demanding from Luther a formal recantation, dismissed him in great anger. Luther gained delay by an appeal to a general council of the church, but the celebrated Dr. Eck forced his hand by challenging him and Carlstadt to a public disputation at Leipzig (1519). Eck reduced

of Germany. Meanwhile a papal bull condemning Luther had been prepared in Rome, and was published in Germany; but Luther's rejoinder was to burn it openly in Wittenberg, along with the decretals which declared the Pope's supremacy (December 1520). Towards the close of the same year, the recently-elected Emperor Charles v., at his first Diet at Worms, received command from Rome to execute the bull; but a strong party successfully pleaded delay, and Luther was summoned to meet the diet on April 16, 1521.

He accepted the challenge, and declared he would go to Worms 'were there as many devils there as tiles on the houses.' He retracted nothing, and the emperor was ready to pronounce sentence, but was again withstood by the electors and princes. After the formal close of the diet, however, the edict of condemnation was passed by trickery. But before any attempt could be made to execute it, Luther had been kidnapped by his friendly elector, and conveyed to the Wartburg. Here Luther resumed his writing of books and pamphlets, and completed a translation of the New Testament into German (published Sept. 21, 1522, with illustrations by L. Kranach; the Old Testament was not finished till 1534). In March 1522 he was in Wittenberg again, preaching, itinerating, and publishing with unabated zeal. But the seeds of reform already sown were now springing up of themselves on every side. Several princes, free cities, and other towns took sides with the new teaching, and it almost seemed as if a mighty transformation was to be realized by relatively peaceful means. But events proved the falsity of the anticipation. The free nobles, smarting under the insolent oppression of the princes and the hierarchy alike, took up arms under Franz von Sickingen; but the movement was soon suppressed, and its leader slain. The Peasants' war (1524-5) was a much more serious affair. The labouring classes, groaning under the taxation of the nobles and the church, gave ready ear to Luther's assertion of the equal freedom and value of all men in God's sight, and under Thomas Münzer raised the standard of revolt against the governing powers generally. The excesses of the insurgents called forth some of the most violent language Luther ever uttered. In 1525 he married Katharina von Bora, an emancipated nun, a step which greatly enriched his character, and strengthened his work. By his hymns (both words and music), by the institution of schools, and the drawing up of catechisms, he deepened the devotional and educational aspects of the reformation, and fixed its principles in the hearts and lives of the people. But his polemics were not yet at an end. When Henry VIII. of England attacked him in a bitter tractate (1522), Luther had been ready with a not less caustic reply; when Erasmus in 1524 directed against him the *De libero Arbitrio*, Luther's *De servo Arbitrio* had given more than a Roland for an Oliver; and now he fell out with his old friends Carlstadt and Zwingli re-

garding the sacraments, and at a conference at Marburg (1529) rejected all proposals of peace with the latter. The emperor was still in a mind to crush the whole movement for his own ends, but at Speyer (1529) and Augsburg (1530) the defiant attitude of the princes again withheld him. Luther's labours as author, organizer, and adviser of nobles continued to the end, but his last years were clouded by ill-health. In 1546, on a journey undertaken to bring about a reconciliation in the family of the counts of Mansfeld, his wasted frame succumbed at Eisleben. Luther is fitly reckoned by Carlyle among the 'heroes' of the race. His was a brave, strong, altogether healthy nature; he combined a penetrating insight into facts, lofty courage and indefatigable energy in dealing with them, and a sincere and simple piety. A signal flaw in his character was his tendency to use rude and intemperate language towards his adversaries.

Luther has been the subject of numerous biographies, including those of Melancthon, Michelet (1835; trans. by Hazlitt, 1846), Koestlin (1875; trans. 1883), Freytag (1883; trans. in America), Kolde (1884-93), and T. M. Lindsay (1903). His *Sämmtliche Werke*, in 67 vols., were published at Erlangen (1826-57); re-issue Weimar from 1883; people's ed. 1892; *Briefe*, ed. De Wette (5 vols. 1825-28); *Table Talk* (1883).

Lutherans, a name said to have been first applied to the followers of Luther by Dr. Eck, and now given to those sections of Protestantism which claim most faithfully to represent the principles of the reformer; hence often used in contradistinction to the Reformed Church (Swiss, Anglican, Scottish Presbyterian, etc.). The most general difference between the two communions was that, whereas the Lutherans laid the chief emphasis upon the substantive principle of the reformation—*viz.*, the doctrine of justification by grace through faith—the Reformed Church took its stand upon the formal principle—*viz.*, the regulative authority of Scripture. The first Lutheran university was founded at Marburg (1527). The conference at Marburg (1529), summoned in order to bring about a mutual understanding between the parties, resulted in failure, chiefly owing to the obduracy of Luther; and from this point the two sections drifted further and further apart. Melancthon designed to obtain a basis wide enough for friendly co-operation between Catholicism and both divisions of Protestantism (*e.g.* in the Augsburg Confession of 1540); but this was declared to be open treachery by the ex-

treme Lutherans, who thereupon removed their chief centre from Wittenberg to Jena. After various bitter controversies, the Osianirian (1549-67), the Crypto-Calvinistic (1552-6), the Synergistic (1555-7), and the conflict regarding predestination (1574-77), unity was restored among the Lutherans by the general acceptance of the Formula of Concord (1580), and from that time their community enjoyed a century of peace and success. It had already extended its domain to Denmark and the rest of Scandinavia, Poland, the Baltic provinces of Russia, and Holland. But its supremacy in Germany was marked by the growth of a new scholasticism, a tendency to rest satisfied with mere doctrinal orthodoxy—a spiritual stupor, the much-needed awakening from which was given by the Pietistic movement; the *Aufklärung* also helped to rouse it to strenuousness. In 1817, the tercentenary of the reformation, King Frederick William III. of Prussia proposed and carried through a scheme of union between the Lutheran and Reformed parties; but certain irreconcilables among the former protested, and ultimately formed an independent body (1841), the Old Lutherans, who are now, however, recognized by government. In Scandinavia the Lutheran Church is episcopalian, but in its home-land the place of bishops is taken by the consistory.

Luton (anc. *Luytone* or *Lygetune*), munic. bor., mrkt. tn., and parish in Bedfordshire, England, on the Lea, 30 m. from London. The parish church of St. Mary is an ancient and interesting edifice. The Plait Hall is the great market for the sale of the straw plait made by the women of the town and district. Other local industries are brass and iron works, cocoa works, and the manufacture of felt hats. Pop. (1901) 36,400. See Davis's *History of Luton* (1855).

Lutsk, tn., Volhynia (Volinsk) gov., S.W. Russia, 147 m. W.N.W. of Jitomir (Zhitomir), cap. of district, at the junction of the Gijitsa with the Stir. It contains a chateau and Orthodox cathedral, and has manufactures of cloth, glass, and paper, also tanning industry. Pop. (1897) 18,525.

Lutterworth, mrkt. tn., Leicestershire, England, 13 m. S. by W. of Leicester. The church of St. Mary is an ancient building, and the old oak pulpit is in part that from which Wycliffe (rector here, 1374-84) first preached the reformed doctrines. In restoring the church an interesting wall-painting representing the general resurrection was discovered. Pop. (1901) 11,029.

Lüttich. See LIÈGE.

Luttringhausen, tn., Rhine prov., Prussia, 5 m. s.e. of Elberfeld; manufactures ironmongery, cotton goods, and brandy. Pop. (1900) 11,261.

Lützen, tn., prov. Saxony, Prussia, 12 m. s.w. of Leipzig; is noted for its two battles—the first fought on Nov. 6, 1632, between Gustavus Adolphus of Sweden and the Austrians under Wallenstein. The second battle took place on May 2, 1813, when Napoleon I. defeated the combined Russian and Prussian forces. Pop. (1900) 3,838.

Lützow, LUDWIG ADOLF WILHELM, FREIHERR VON (1782-1834), Prussian general, was empowered in 1813 to raise the corps of free-lances which subsequently bore his name. This body of patriots, clad in black (hence the designation 'Black Troop'), and numbering less than 500 cavalry and 3,000 foot, made for itself a notable name in the Napoleonic wars. In 1889 an infantry regiment of the German army, which traced its origin to Lützow's corps, received his name. See K. von Lützow's *Adolf Lützows Freikorps in den Jahren 1813 und 1814* (1884), and Jagwitz's *Geschichte des Lützowschen Freikorps* (1892).

Luxembourg, prov., Belgium, in the extreme s.e., covered in great part by the wooded plateau of the Ardennes. Iron is mined, and iron wares, cattle, leather, and cloth are produced. Area, 1,705 sq. m. Pop. (1900) 219,200. Chief town, Arlon.

Luxembourg, FRANÇOIS HENRI DE MONTMORENCY-BOUTEVILLE, DUC DE (1628-95), took part in the wars of the Fronde, but pardoned (1659), was subsequently created Duc de Luxembourg. Given a command against Holland in 1672, he defeated the Dutch, and finally carried out a magnificent retreat from Utrecht. He defeated William III. of England at Leuze (1691), at Steenkerk (1692), and at Neerwinden (1693). See *Histoire Militaire du Duc de Luxembourg* (1756), and *Mémoires . . . écrits par lui-même* (1758).

Luxembourg Palace. See PARIS.

Luxemburg. (1.) Formerly Lützelburg, independent grand-duchy of Europe, but included for commercial purposes in the German customs union, is situated between France, Belgium, Lorraine, and Rhineland. Area, 997 sq. m.; pop. (1900) 236,543. The people are almost entirely Roman Catholics, and of Germanic descent. The grand-duchy forms a low plateau (1,800 ft.), intersected by several valleys, and is drained by the Moselle and its tributary the Sauer (Sure).

The chief crops are cereals, flax, hemp, rape-seed, and the vine. Meadows and grass cover 15½ per cent. of the area, and forests 29 per cent. The mining and smelting of iron ore form one of the most important occupations. Gloves, leather, pottery, paper, cloth, beer, sugar, and vinegar are manufactured. The grand-duke is a constitutional sovereign, and is assisted by a Chamber of Deputies. The history of the state begins with the countship of Lützelburg, founded in the 10th century, and converted into a duchy in 1354. In 1444 Luxembourg was united with Burgundy, in 1555 with Spain (but at the same time accounted as a state of the empire), in 1659 in part with France, in 1713 again with the empire, and in 1797 once more with France. In 1815 it was made a member of the German Confederation, although linked by personal union with the crown of Holland. On the death of William III. of the Netherlands in 1890, the grand-duchy descended to Adolphus, Duke of Nassau (1817-1905), who was succeeded as grand-duke by his son William (1852). (2.) Capital of above grand-duchy; is a picturesque town, crowning a rocky peninsula above the little river Alzette, with three industrial suburbs—Pfaententhal, Grund, and Clausen—at its feet. It was stormed or captured by the Burgundians in 1443, by the French in 1479, 1542, 1684, and 1796. The industries include tanning and the manufacture of gloves, pottery, vinegar, and machinery. Pop. (1900) 20,900. See H. Phipps's *Das Luxembourg Land* (1895).

Luxeuil (anc. Lixovium), tn., dep. Haute-Saône, France, on the river Breuchin, at foot of Vosges Mts., 27 m. N.W. of Belfort; contains a fine church dating from the 14th century, and remains of a monastery founded by St. Columbanus (590). Has mineral springs, and is noted for its baths. Pop. (1901) 5,294.

Luxor. See THEBES.

Luynes (or LUINES), CHARLES D'ALBERT, DUC DE (1578-1621), constable of France, who instigated Louis to crush the Huguenots in the south. Luynes failed to take Montauban, their chief stronghold (1621). He was successful, however, at Montheur, but died at the moment of victory.

Luz, the name of two places in Palestine. The first was a village close to Bethel (Gen. 28:19); the second was in the country of the Hittites (Judg. 1:23).

Luzan, IGNACIO DE (1702-54), Spanish scholar, man of letters, and founder of the French school in Spain. He was the first to publish in Spanish some of Milton's verse, and his appreciations of Lope de Vega; Cervantes, and

others, are excellent. His 'Art of Poetry' (*La Poética o Reglas de la Poesía*, 1737), advocating purer style and ideals, is his principal work. See Ticknor's *Hist. of Spanish Literature*, vol. iii. (1849), and Alcalá Galiano's *Historia de la Literatura* (1845).

Luzern. See LUCERNE.

Luzon, or LUÇON, the largest, most prolific, and, except a few small islets, most northerly of the Philippine Islands. In the s.w. of the island is Manila, the capital. Area estimated at 40,000 sq. m. Like the other islands of the group, it consists of coastal plains and a central mountainous district, among which fertile valleys occur. Several volcanoes are still active, including Mavon and the Taal. The highest mountains and the largest rivers are in the N. of the island; in the s. there are several fresh-water lakes. The soil is admirably adapted for the culture of tobacco, sugar, rice, and manilla hemp. The bulk of the population is of mixed Malay, Chinese, and Latin stock, with a slighter infusion of Indonesian blood; but the jungle tribes, which are numerous in the hills, are either of the Negrito or of mixed Negrito and Indonesian origin. The language of commerce is Malay, but Spanish and, latterly, English are much used, while the aborigines have their own dialects. A line of railway, about 120 m. long, running due N. across the isthmus of the peninsula N. of Manila Bay to the Gulf of Linguen, was opened in 1892. See PHILIPPINE ISLANDS and MANILA.

Luzula, a genus of plants, order Juncaceæ. They have flat, grasslike leaves, covered with long white hairs, a brownish chaffy perianth of six parts, six stamens with yellow anthers, and a one-celled capsule containing three seeds. Among the British species are *L. sylvatica*, the great wood-rush; *L. campestris*, the field wood-rush; and *L. pilosa*, the hairy wood-rush.

Luzzati, LUIGI (1841), Italian statesman, of Jewish origin; became professor of constitutional law at Padua, and afterwards at Rome. He entered Parliament (1871), and helped to bring about Crispi's fall (1891), but himself lost office (1898). He has written several works on state and church, banking, and government.

Lwoff, ALEXEI (1799-1870), Russian violinist and composer, born at Reval, who became a general in the Russian army (1836), and at the same time conductor of the imperial court choir. His best-known melody was adopted as the Russian national anthem to Shukowski's words (1833). He wrote violin concertos, operas, and numerous chants and tunes used by the Russian Church.

LXX. (abbreviation for *Septuaginta*), the Septuagint, the most ancient version of the Old Testament (Greek). See **BIBLE**.

Lyakhov. See **NEW SIBERIA ISLAND**.

Lyall, SIR ALFRED COMYN (1835), English administrator and author, born at Coultston, Surrey; was lieutenant-governor of the North-West Provinces, India (1882-7), and was appointed a member of the council of the Secretary of State for India (1888). He has written *The Rise of the British Dominion in India* (1893), *Asiatic Studies* (1882-99; 2nd ed. 1899), *Warren Hastings* (1889), *Tennyson* (1902), and *Life of the Marquis of Dufferin* (1905). His administrative work is noticed in Lord Roberts's *Forty-one Years in India* (1897).

Lyall, EDNA (d. 1903), pseudonym of Ada Ellen Bayly, English novelist; a native of Brighton, whose first published work, *Worn by Waiting* (1879), met with little success, although *Donovan* (1882) and its sequel *We Two* (1884) at once attracted a large reading public. Her other works include *In the Golden Days* (1885), *Knight Errant* (1887), *A Hardy Norseman* (1889), *Derrick Vaughan* (1889), *Doreen* (1894), and *The Hinderers* (1902). See *Life* by Payne (1903) and by Escreet (1904).

Lycabettus, conical hill, Greece, being an offshoot of the range of Pentelicus, N.E. of Athens; height, 900 ft. It is now called Mt. St. George.

Lycanthropy (Gr. *lykos*, 'a wolf'; and *anthrōpos*, 'a man') is the peculiar power once attributed to certain people, of assuming the character and the appearance of wolves. Such men were called 'lukanthropoi' (Gr.), 'lous-garous' (Fr.), 'werewolves' or 'men-wolves', 'turnskins', and 'shape-changers' (Eng.). The term lycanthropy is not restricted to its literal meaning, but includes the power of assuming any animal shape—usually that of wolves, dogs, and bears. In Norway the belief still exists that the Lapps have the faculty of turning themselves into bears. There are numerous traditions in Europe of werewolves. The origin of the belief in lycanthropy is very ancient and very obscure. The theory of the remnants of a cannibal tribe surviving in the midst of a higher race, or of a strain of ancestral savage blood occasionally manifesting itself, may find support in a Middle-English ms. quoted by Halliwell, which distinctly states that cannibals 'are called werewolves.' On the other hand, it is well known that children and primitive peoples have the faculty of convincing themselves and their

comrades that they have temporarily assumed the shape of animals, without the slightest actual change in their appearance. (See **GLAMOUR**.) The stories of ghouls and vampires cannot easily be differentiated from those of werewolves. Mr. S. R. Crockett has made effective use of the werewolf superstition in his novel of *The Black Douglas* (1899).

Lycaon, in ancient Greek legend, a king of Arcadia, the son of Pelasgus, of whom it is related that he was the first civilizer of Arcadia, and that he was turned into a wolf because he offered human sacrifices to Zeus. The various accounts are given by Apollodorus, Dionysius of Halicarnassus, Ovid, and Pausanias.

Lycaonia, ancient district of Asia Minor, bounded by Galatia on the N., Cappadocia on the E., Cilicia on the S., Isauria and Phrygia on the W. Its chief cities were Derbe, Iconium (the capital), Lystra, and Laodicea. It became a separate province in 373 A.D., and now forms part of Konia vilayet. See Wilson's *Asia Minor* (1895); Ramsay's *Historical Geography of Asia Minor* (1890).

Lycaste, a genus of tropical American orchids. The flowers are characterized by a transverse appendage at the middle of the lip. The species include *L. Deppet*, with pale greenish flowers with markings, the lip being white, spotted with crimson, and furnished with a golden crest; *L. cruenta*, green and orange, the lip being orange and crimson; *L. aromatica*, yellow, with hairy lip; and *L. jugosa*, white, with purple stripes. Many of the species are easily cultivated, and require but little heat.

Lyceum, THE, was a famous gymnasium at ancient Athens, which stood outside the walls, to the south-east, on the bank of the Ilissus. It took its name from the temple of Apollo Lycius, and was famous as the scene of the teaching of Aristotle and his followers, the Peripatetics. Hence is derived the French term, *lycée*, for a secondary school. See Frazer's *Pausanias* (1900).

Lyceum Theatre, THE. This theatre is the third erected in the same site—Wellington Street, Strand, London. The first (built 1794-5) was not licensed till the Drury Lane company took temporary possession (1809), and was renamed the English Opera House (1810). The second was opened (1816), when notable performances took place by Mrs. Keeley and Edmund Kean, until it was burnt down (1830). The third dates from 1834. The Mathews-Vestris management is memorable for Planche's 'fairy

extravanzas' and Beverley's transformation scenes. Fechter became manager (1863), and played in English and French. Under the Batemans' management (1873-78), Irving made his first appearance at the Lyceum, and inaugurated his own management (1878) by a revival of *Hamlet*, with Ellen Terry as Ophelia. From that time the house was largely identified with Shakespearean productions, Sir Henry Irving maintaining the highest traditions of English dramatic art. The theatre was transferred to a limited liability company (1899), and shortly afterwards (May 1901) the London County Council insisted on structural alterations which could not be carried out. Irving therefore gave his last performance there on July 19, 1902. The house has now been opened as a music hall.

Lych-gate, or **CORPSE-GATE**, a covered, usually gabled churchyard gate, beneath which it was formerly customary for a bier to rest during the reading of the introductory part of the service. There are numerous examples in Great Britain—notably that at Bray, which is said to date from 1448.



Lychnis.

1. *L. flos-cuculi*; 2. petal; 3. *L. fulgens*.

Lychnis, a genus of plants, order Caryophyllaceae, characterized by its flowers possessing a tubular, five-cleft calyx, five long-clawed petals, ten stamens united at the base with the stalk of the ovary, and five styles. Five species are natives of Britain, the commonest being *L.*



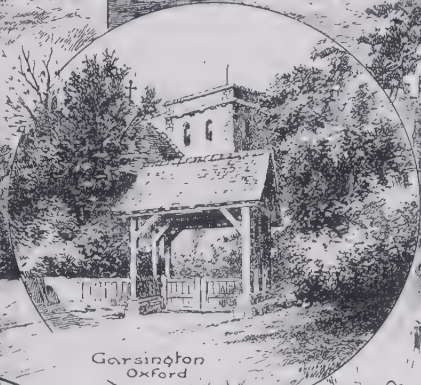
West
Wickham
Kent



Llan Rhos
Giles



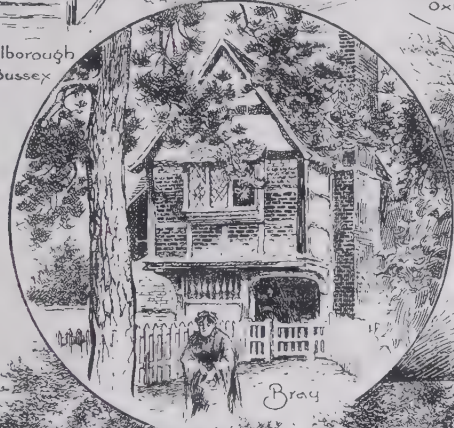
Palborough
Sussex



Garsington
Oxford



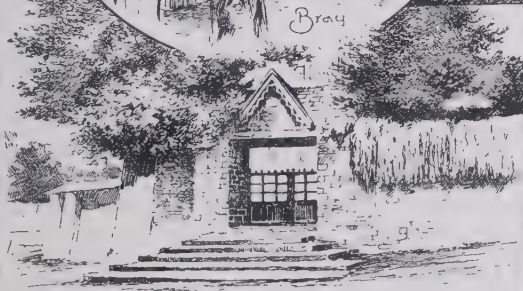
Limpsfield
Surrey



Bray



Boughton
Monchelsea,
Kent



Berryn-Arbor,
Devon
(In the form of a Cross.)



Moorwinstow,
Cornwall

Some noted English Lych-gates.

diurna, the red robin or campion of our hedges, with its downy leaves and pink flowers; the white-flowered *L. vespertina* (evening campion), whose flowers become fragrant as night approaches; and *L. flos-cuculi*, the ragged robin of our marshes, with its purplish stems and narrowly-segmented, 'ragged,' rose-coloured petals. Of the cultivated species, we may name *L. chalcidonica*, a Russian perennial bearing clusters of scarlet flowers in summer; *L. coronaria*, red-flowering; *L. fulgens*, a dwarf-growing, scarlet-flowered species, with several beautiful varieties, notably *L. f. Haageana*; and *L. viscaria*, the red German catch-fly, a rare British plant, with pink flowers.

Lycia was a district at the s.w. angle of Asia Minor, bounded on the w. by Caria, on the n. by Phrygia and Pisidia, and on the e. by Pamphylia. The inhabitants strenuously resisted Greek colonization; Ctesus failed to conquer them, and the Persians did so with difficulty, though in the 4th century B.C. they became subject to the Carian tyrants. The chief cities were Xanthus, Patara, Pinara, Tlos, Telmessus, Myra, Limyra, and Olympus. In the 5th century they joined the Athenian league, but with the rest of Asia Minor they became subject to Rome. A fine collection of Lycian remains is in the British Museum. See Grote's, Holm's, and Bury's *Histories of Greece*; Wilson's *Asia Minor* (1895); Ramsay's *Historical Geography of Asia Minor* (1890); Fellows's *Discoveries in Lycia* (1841); Benndorf's *Reisen in Lykien und Karien* (1884).

Lycium, a genus of climbing or trailing plants, order Solanaceæ. Most of the species produce beautiful funnel-shaped flowers in great profusion, and are worth growing as trellis plants. Among the best are *L. barbarum*, bearing yellow and purple flowers; *L. af-rum*, a spiny shrub with solitary, drooping, yellow flowers; and *L. europæum*, used for hedges in the Greek islands.

Lyck, or LYK, *tu.*, prov. E. Prussia, Germany, 88 m. s.e. of Tilsit; contains on an island in Lake Lyck a castle of the Teutonic Knights dating from 1273. Manufactures machinery and leather. Pop. (1900) 11,419.

Lycomedes, in ancient Greek legend, was the king of the Dolopians, in the isle of Scyros, to whose house Achilles was sent by his mother Thetis, in the disguise of a girl, to save him from the Trojan expedition. When Theseus sought his protection, Lycomedes treacherously hurled him over a rock. The story is told by Apollodorus, Pausanias, and Plutarch.

Lycoperdon, or PUFF-BALL, a genus of gasteromycetous fungi; several species of which are common in Britain, *L. gemmatum* being the most common. When they first appear they are masses of solid, nearly homogeneous, white flesh; but as they grow older the white colour gives way to brown, and the solid mass is replaced by a dry and shrivelled rind or casing containing within a quantity of fine brown powder—the spores.



Lycoperdon gemmatum.

Lycophron (c. 260 B.C.), a celebrated grammarian and poet of the Alexandrian school, was a native of Chalcis in Eubœa. His only extant work is the *Alexandra* or *Cassandra*, a long monologue consisting of 1,474 iambic verses, in which Cassandra prophesies to Priam the destruction of Troy. Editions: Tzetzes (1546), Canter (1596), Potter (1702), Reichard (1788), Sebastian (1804), York (1806), and Holzinger (1895).

Lycopodium, a genus of plants commonly known as club mosses (order Lycopodiaceæ), many of them desirable and handsome plants. Among the stove species are *L. Hookeri*, an evergreen, and *L. Phlegmaria*. Among the hardy species, which may be grown in the shade without glass protection, are *L. clavatum*, *L. dendroideum*, resembling a tiny fir tree, and *L. alpinum*, with prostrate stems and evergreen leaves.

Lycurgus. (1.) A famous Spartan lawgiver, who is said to have lived about the beginning of the 9th century B.C. The common account is that he was the son of Eunomus, king of Sparta, and brother of Polydeces, the latter of whom succeeded to the throne, and then died, leaving his wife with child. When the child (Charilaos) was born, Lycurgus proclaimed him king, and acted as his guardian. He left Sparta for some time,

and on his return found the country in a state of anarchy, when all parties called him to the task of restoring order. This he accomplished, redividing the land among the citizens, and introducing the constitution, which, with few alterations, remained as long as Sparta existed as a state. He was afterwards worshipped as a god at Sparta. (2.) Athenian orator and statesman (c. 396–323 B.C.), who was a pupil of Plato and Isocrates, and supported Demosthenes against Philip. Alexander demanded his surrender (with that of Demosthenes) for inciting Thebes to revolt (336), but finally gave up his claim. Lycurgus was one of the leading statesmen at Athens, and was a most successful minister of the public revenue (338–326). Editions: Rehdantz (1876), Thalheim (1880), and Nicolai (1885).

Lyda, a genus of sawflies, hymenopterous insects (family Tenthredinidæ), whose larvæ are among the pests of the arboriculturist. Their pupal stage is passed in the soil, and they spin a web over leaves, within which web several larvæ may usually be found. *L. Pyri* and *L. nemoralis* are the species which are most injurious to British fruit trees.

Lydda, or LOD, city, Palestine, on the plain of Sharon, 10 m. s.e. of Joppa, near the foot of the hills. According to 1 Chron. 8:12, it was founded by Shamed, of the tribe of Benjamin. It is noticed on monuments as early as 1600 B.C. It is now a small village (Ludd) with a church of St. George, founded in the 12th century A.D., and repeatedly destroyed and rebuilt.

Lyddite, a high explosive used in the British service as a bursting-charge for shells. It consists of picric acid, $C_6H_2(NO_2)_3 OH$, prepared by the action of nitric acid on phenol, and consolidated by melting. It is an intensely bitter crystalline solid of bright yellow colour, and explodes only with difficulty under the influence of a powerful detonator, producing yellow fumes, as the explosion is usually incomplete. The name lyddite is derived from Lydd in Kent, where the explosive was first tested. The late South African war showed lyddite to be less effective than had been anticipated—for example, in the eight days' bombardment of Cronje at Paardeberg—and experiments with substitutes are in progress (1906).

Lydenburg, cap. of div. of same name, Transvaal Colony, S. Africa, in a well-watered and fertile hollow at the w. base of Mauch Berg, 144 m. e.n.e. of Pretoria. It is a gold-mining town, in a district well suited for

the cultivation of cereals (especially wheat), tobacco, sugar, and coffee; coal also occurs in the neighbourhood. In the South African war General Botha with 2,000 men took up a strong position in the almost impenetrable Mauch Berg overlooking the town, and was with much difficulty dislodged by a turning movement of General Ian Hamilton.

Lydgate, JOHN (c. 1370–c. 1451), English poet, studied at Oxford, and entered the Benedictine monastery at Bury St. Edmunds. He endeavoured to take up English verse where Chaucer dropped it, but his rank as a poet is far below that of his great master. It was for Humphrey of Gloucester that he translated *Bochas upon the Fall of Princes* (1430); while the *Troy Book*, which was completed in 1420, was written by desire of the Prince of Wales, afterwards Henry V. Among his other works are *The Storie of Thebes*, *The Daunce of Machabre*, and *The Temple of Glas*.

Lydia, anc. dist. of Asia Minor, in the centre of the western end of the peninsula; bounded by Mysia on the N., Phrygia on the E., Caria on the S., and the Aegean Sea on the W. The coastland, however, was known as Ionia. The mountain range of Tmolus divides the district into two valleys—that of the Hermus to the N., and that of the Cayster to the S. About 700 B.C., Gyges, a native Lydian, slew Candaules, the last Meonian king; thenceforth the country was known as Lydia. The dynasty founded by Gyges lasted for one hundred and fifty years; the last king, fifth in succession from Gyges, was the famous Croesus. Under this dynasty Lydia attained to great wealth and power. The earlier monarchs aimed chiefly at the conquest of the Ionian Greek cities: Smyrna was absolutely destroyed by Alyattes (c. 600 B.C.), and Croesus completed the subjection of all the Greek cities in Asia except Miletus, which had made a treaty with his father, Alyattes. In 546 B.C., however, Croesus declared war against Cyrus the Great, was defeated, and lost his kingdom. It was in Lydia that coins were first invented, probably about 700 B.C.; the earliest coins were stamped bars of electrum, an alloy of silver and gold, held to be worth ten times a silver bar of equal weight and three-quarters of a gold bar. By Cyrus's conquest Lydia passed into the Persian empire, in which it remained until Alexander, in return for the prompt submission of the Lydians, restored them their freedom in 334 B.C.; but it soon passed into the power of the kings of Syria, and afterwards belonged to the kings of Pergamus. As

Attalus III., the last king of Pergamus, bequeathed his dominions to the Romans, it formed part of the Roman province of Asia from the year 133 B.C. See Herodotus's *History*; Grote's, Holm's, and Bury's *Histories of Greece*; Meyer's *Geschichte des Altertums* (1884); and Wilson's *Asia Minor* (1895).

Lye is a term applied to the alkaline solutions of potassium and sodium hydroxides and carbonates. It is used in soapmaking, in neutralizing an acid, and in cleansing grease from other substances, such as metals to be plated.

Lyell, SIR CHARLES (1797–1875), geologist, was born at Kinnordy, Forfarshire, Scotland; educated at Midhurst and Oxford, where he attended Buckland's lectures and became interested in geology. After graduating he studied law, but soon became more and more involved in geological work. With Murchison he visited Auvergne and Italy. Switzerland, Sicily, France, and Scotland were also the scenes of geological tours. The first volume of *The Principles of Geology* appeared in 1830, and two more volumes in subsequent years. The work was received with great favour, on account of its freshness of treatment and literary style. His main idea was the uniformity of the operations of nature, and the sufficiency of the agents acting on the earth's surface at the present day to produce all the changes which were indicated by the rocks of the earth's crust. Hence Lyell became the foremost champion of the principle of 'uniformitarianism.' There was nothing new in his teaching; it had been first propounded by Hutton, and very clearly explained by Playfair, thirty years before Lyell's book appeared. But their philosophic doctrines had not yet penetrated the minds of the English scientific public, and Lyell did an enormous service to knowledge by elucidating and exemplifying them. His other books are *The Elements of Geology* (1838), *Travels in North America* (1845), *A Second Visit to the United States* (1849), and *The Antiquity of Man* (1863). Lyell received a knighthood in 1848, and subsequently a baronetage. See *Life and Letters of Sir Charles Lyell*, ed. by Mrs. Lyell (1881), and Bonney's *Charles Lyell and Modern Geology* (1895).

Lygodium is a genus of tropical ferns of twining habit, all handsome, and of value to the stove-gardener. The stems are wide-scapant, and the fronds are permanent, generally in old plants becoming so entangled as to form a mass of dense foliage. Among the best species are *L. volubile*, *L. japonicum*, *L. palmatum*, and *L. scandens*.

Lyly, JOHN (1553–1606), dramatist, was born in Kent. He was at Magdalen College, Oxford, and after some trouble with the authorities, took his B.A. degree in 1573 and his M.A. in 1575. An attempt to secure a fellowship through the influence of Lord Burleigh failed. In 1579 Lyly was incorporated M.A. at Cambridge. In the same year appeared the first part of his fantastically written and moralizing romance, *Euphues*, and possibly also his play of *Endymion*, the plot of which seems to turn on the relations of Elizabeth to her favourite, the Earl of Leicester. *Euphues* became popular in fashionable circles, and for a period set a model of prose style. Lyly was appointed vice-master of the singing-school of St. Paul's, for whose performances most of his extant comedies were written. He was also in some way attached to the service of Lord Burleigh, took the anti-Puritan side in the Martin Mar-Prelate controversy, and wrote, perhaps in collaboration with Thomas Nash, the pamphlet called *Pappe with an Hatchet* (1589). He sat in various Parliaments for Hinton, Wilts; for Appleby, Westmorland; and for Aylesbury, Bucks. But in 1591 the St. Paul's performances came to an end, and Lyly's chief employment was gone. He had also been disappointed in his hope of the mastership of the revels. Little is heard of him from 1596 to his death. Romances—*Euphues*, the *Anatomy of Wit* (1579, etc.); *Euphues and his England* (1580, etc.)—both ed. E. Arber, 1868; ed. F. Landmann, 1887. Plays—*Campaspe* (1584, 1591); *Sapho and Phao* (1584); *Endymion* (1591; ed. G. P. Baker, 1894); *Galathea* (1592); *Midas* (1592); *Mother Bombe* (1594, 1598); *The Woman in the Moone* (1597); *Love's Metamorphosis* (1601); *Collected Plays* (1632; ed. F. W. Fairholt, 1858; ed. R. W. Bond, with biography, 1902). See C. G. Child's *John Lyly and Euphuism* (1894), and Wilson's *John Lyly* (1905).

Lyme Regis, munic. bor., bathing and health resort, Dorsetshire, England, on S. coast, 5½ m. S.E. of Axminster. The town is picturesquely situated, and the district is of great geological interest on account of its 'blue lias' rocks. Monmouth landed here (1685) a few days before the battle of Sedgemoor. Pop. (1901) 2,095.

Lymington, munic. bor., seaport, and bathing resort, New Forest district, Hampshire, England, 18 m. S.W. of Southampton. Four miles S.S.W., on small peninsula, is Hurst Castle, where Charles I. was confined. Pop. (1901) 4,165.

Lymph (Lat. *lymphā*, 'water') is a clear, watery, albuminous fluid which bathes all the tissues of the body. It is faintly yellow or colourless, and is alkaline in reaction. Derived from the blood, it laves and nourishes the tissue elements, and returns to the circulation by the lymph vessels, bringing such pabulum as the tissues do not immediately require for their nutrition. It is poured into the large veins near the heart, and in its course through the lymphatic vessels and glands it acquires a number of cells known as lymph corpuscles, which on reaching the circulation become the lymphocytes of the blood. During digestion the lymph returned from the villi of the small intestine becomes charged with fatty molecules and extractives from the food. These change its character, giving it a milky appearance, so that the vessels are known as lacteals and the lymph as chyle.

Lymphatics are the superficial and deep vessels and glands which carry lymph throughout the body. The vessels are tubular, and their walls have three thin coats—epithelial, muscular, and fibrous. Like veins, they have valves formed of semi-lunar flaps, which direct the onflow of the lymph. The lymph enters the lymphatic capillaries by rootlets arising in the spaces between connective tissue cells, muscular fibres, etc., and by minute stomata or apertures between the epithelial cells of serous surfaces. There is no direct communication between the capillaries of the blood and those of the lymph, which must, therefore, irrigate intermediate tissues on its way from one set of vessels to the other. From the network of lymphatic capillaries small lymphatic vessels arise, which either anastomose into larger trunks or pass to a lymphatic gland. The thoracic duct is the terminal trunk of the system. The duct conveys the chyle and the greater part of the lymph into the left subclavian vein at its junction with the internal jugular. The lymph from the right side of the head, neck, and chest, and from the right arm, is carried by the right lymphatic duct to the right subclavian vein. In the course of the lymphatic or lacteal vessels through the mesentery and thorax, and more superficially in the neck, groin, armpit, and popliteal space, are numerous glands, generally kidney-shaped, and varying from the size of a hemp seed to that of an almond. In man the onflow of the lymph is largely enforced by the respiratory movements, but some lower animals possess pulsating lymph hearts which supply the motive power.

From their powers of absorption, the lymphatics are especially liable to be infected by a poison introduced into the tissues. Tubercle bacilli spread from gland to gland, and frequently lead to caseation and to suppuration. New formations, if at all malignant, also advance by means of the lymphatics. Thus sooner or later a cancer of the breast involves the axillary glands. Apart from such secondary invasions, the lymphatic system is sometimes the primary seat of disease, which may vary from a comparatively insignificant lymphoma, or increase of the adenoid tissue on the one hand, to a lymphosarcoma of extreme malignancy on the other.

In acute inflammatory conditions of the lymphatics rest is imperative, and hot fomentations, to which laudanum may be added, should be constantly applied. In the more chronic forms an early incision may save an unsightly scar, and prevent the spread of the disease.

Lynceus, in ancient Greek legend the name of two persons.

(1.) A son of Egyptus, who married Hypermetra, one of the Danaides. (2.) A son of Aphareus and Arene, and brother of Idas, and renowned for his keen sight. With Idas he took part in the Argonautic expedition. See **IDAS**, and Kingsley's *The Heroes* (1856).

Lynchburg, city, Virginia, U.S.A., on the S. bk. of the James R., 120 m. W.S.W. of Richmond. The principal industries are the manufacture and export of tobacco. Pop. (1900) 18,891.

Lynch Law is another name for lawlessness. Charles Lynch (1736-96) was a farmer in Virginia, U.S.A., who supported revolutionary principles in the district where he lived by catching 'Tories' and infamous persons, and hanging them up by their thumbs till they cried out, 'Liberty for ever.' Hence the term has been applied to any rough-and-ready administration of justice by a mob in cases where the law is inadequate or dilatory.

Lynnhurst, par., New Forest div., Hampshire, England, 8½ m. S.W. of Southampton, contains the King's house, the official residence of the lord warden of the New Forest.

Lynnhurst, JOHN SINGLETON COPELEY, BARON (1772-1863), lord chancellor of England, was born at Boston, U.S.A., and graduated as second wrangler at Cambridge, England (1794). After a singularly successful legal career, during which he was solicitor-general (1819), attorney-general (1824), master of the rolls (1826), and three times lord chancellor, he was raised to the peerage (1827). In the Wellington cabinet

he attained great influence, and was in a measure responsible for the memorable decision in 1829 on the Catholic Emancipation question, while his name is also attached to the Act of 1835 in connection with the Deceased Wife's Sister Bill. See Campbell's *Lives of the Chancellors*, vol. viii. (1869), and Martin's *Life of Lord Lynnhurst* (1883).

Lynndsay, SIR DAVID. See LINDSAY, SIR DAVID.

Lynedoch, THOMAS GRAHAM, LORD. See GRAHAM.

Lynce, REV. JOSEPH LEYCES-TER. See IGNATIUS, FATHER.

Lynce, SIR WILLIAM JOHN (1844), minister for trade and customs in the Commonwealth of Australia from 1903 to 1904, and at present (1906). Though he had opposed federation, the first governor-general asked him (1900) to form a ministry. He declined, but took office as minister for home affairs (1901-3). He was secretary for public works (1885, 1886-7, and 1891-4), secretary for lands (1891), and premier and colonial treasurer of New South Wales (1899-1901).

Lynn, or LYNN REGIS. See KING'S LYNN.

Lynn, city and seaport, Essex co., Massachusetts, U.S.A., on the N. coast of Massachusetts Bay. It is one of the largest shoe manufacturing places in the world. Pop. (1900) 68,513.

Lynn Canal, inlet, Alaska, stretching N. from Admiralty Is., with a length of 100 m. and a width of about 6 m. On its shores are Seward City, near Berners Bay, noted for mining, Skagway, and Drea. It is the gateway to the Klondike region, and under the award of 1903 belongs to the United States.

Lynnton and Lynmouth, two summer resorts on N. coast of Devon, England, near Exmoor, 18 m. N.E. of Barnstaple. Lynnton is situated on a cliff 500 ft. high, with Lynmouth below. The two places are connected by a water-balance lift. Pop. Lynnton (1901), 1,641; Lynmouth, 402.



European Lynx.

Lynx, a group of species belonging to the genus *Felis*, which differ from the true wild cats in the larger size, longer limbs,

short, stumpy tail, and tufted ears. The colour is light brown or gray, spotted with a darker shade. In habitat the animals are largely arboreal, and they are remarkable for their ferocity and savage disposition. Their soft, thick fur is highly valued by furriers. In N. Europe and in Asia *Felis lynx* occurs; in N. America *F. canadensis* and *F. rufus*, the latter the American 'wild cat' or bay lynx, together with two other species or varieties. Asia has also three other species or varieties in addition to *F. lynx*.

Lynx, a small constellation north of Gemini, formed by Hevelius in 1690. It contains many double stars, one of which, 12 Lynceis, has a computed period of 486 years. R and S Lynceis are extensively variable in long periods.

Lyon Court. The Lyon Court is one of the judicatories of the kingdom of Scotland, the integrity of which is guaranteed by one of the articles of the treaty of Union of 1707. It is charged with (1) the administration of the laws of arms among his Majesty's subjects of Scottish descent; (2) the settlement of claims to precedence in Scotland; (3) the regulation of public processions and ceremonials; (4) the recording of pedigrees; and (5) the appointment and superintendence of the officers styled messengers-at-arms, who are charged with the execution of legal diligence, authorized by the supreme courts of Scotland. The court is composed of the Lord Lyon and his brethren heralds. Its decisions on all matters of heraldry and precedence are final; but should any subject consider his patrimonial rights to be invaded by any sentence of the court, he may appeal for redress to the Court of Session. At what date the court was established is not clear. The Lyon herald is referred to in the Exchequer Rolls of 1377, and the earliest official armorial now in existence is that executed by the poet Sir David Lindsay of the Mount, then Lyon King of Arms, in the reign of King James V. (1513-42). His work was acknowledged as the official register for the kingdom by the Privy Council of Scotland on December 9, 1630. During the usurpation the registers remained in the custody of Sir James Balfour of Denmiln, knight, Lyon King (1630-57), and these records are now in the Advocates' Library, Edinburgh. The present register is complete from the year 1672, and no persons of Scottish descent whose arms are not registered in it have the right to use armorial bearings. By an act of Parliament passed in the reign of

King Charles II., Sep. 10, 1672, the Lyon King and his brethren heralds are empowered, not only to matriculate the arms of those entitled to record, but also to grant arms to virtuous and well-deserving persons—a phrase liberally translated by the Lyon Court. The fees for a matriculation are about £16, and for a new grant about £45—those amounts being fixed by 30 Vic., cap. 17, and payable to H.M. Exchequer. The court of the Lord Lyon at present consists of the Lord Lyon King of Arms, Albany, Ross, and Rothesay heralds, and Carrick, March, and Unicorn pursuivants. The staff includes a Lyon clerk and keeper of the records (who for a considerable time past has been one of the heralds), a procurator fiscal, a herald painter, and macer. The offices are situated in H.M. General Register House, Edinburgh. See HERALD.

Lyonesse, the land of the Arthurian legends, in which was Arthur's city of Camelot, variously held to have been either the present Cornwall or a country stretching beyond it westwards and now covered by the sea. It is the scene of the story of Tristan and Iseult, and of the episodes included in Tennyson's *Idylls of the King*. See Malory's *Morte d'Arthur*, and other works dealing with the Arthurian legends.

Lyonia, a genus of North American and West Indian shrubs and trees, order Ericaceæ, with alternate leaves and small flowers with urceolate corollas. Among the species are *L. ferruginea*, with white flowers in spring, the whole plant being covered with rusty-looking scales; and *L. ligustrina*, a hardy shrub, bearing clusters of small white flowers in summer.

Lyon King of Arms. See LYON COURT, and HERALD.

Lyonnais, anc. prov. of France; it formed one of the Roman divisions of Gaul. At first part of Burgundy, it was united to France in 1310, and forms the departments of Loire and Rhône.

Lyons (Fr. *Lyon*; Lat. *Lugdunum*), city and episc. see, dep. Rhône, France, stands at the confluence of the Rhone and the Saône, and is the third city of the country. It is 240 m. S.E. of Paris, and 170 m. N. by w. of Marseilles. The city, a fortress of the first class, is also fortified by a strong wall (13 m. in circumference) on the N. and E. sides. The silkworms reared in the Rhone valley, and the proximity of coal and iron (at St. Etienne, 36 m.), have made Lyons, the first silk-manufacturing town in France. The city is likewise the natural focus of commerce from

N. and S., and both the Rhone and the Saône are connected by canals with all the great waterways of France. Lyons is adorned with numerous interesting and beautiful buildings, amongst which may be mentioned the cathedral of St. Jean (12th to 15th century); the archiepiscopal palace (15th century restored); the church of St. Martin d'Ainay, which is built on the site of a Roman temple, and contains the remains of a Roman votive altar; the Hôtel de Ville (1646); and several extensive and admirably arranged picture galleries and museums, in addition to a state university ranking next to that of Paris in the number (2,500) of its students, and a public library, which boasts some of the earliest extant specimens of printing. The Parc de la Tête-d'Or, on the bank of the Rhone, contains a large lake. At the entrance is a monument commemorating the heroes of 1870-71. The silk industry (first established in 1450 by Italian refugees) is centred in the city, but most of the factories lie in the surrounding country towns and villages—such as Villeurbanne, Ste. Foy, Caluire-et-Cuire, etc. The industries (which are largely conducted on the 'domestic' system of manufacture) employ about 300,000 persons in and about Lyons, and the best qualities of silk are made in the suburb of La Croix Rousse in the S.E. The value of the silk and stuff production was (1904) £16,360,000—the output of some 100,000 looms, of which 500 are power-looms. Raw silk comes chiefly from Japan and China (52 per cent.), and from the Rhone valley, Italy, and the Levant. The export of manufactured silk goods in 1904 was £11,977,160. Other manufactures are those of cottons, hardware, dyes, sulphuric acid, chemical manure, starch, candles, soap, paper-hangings, and machinery, and much business is done in chestnuts, cheese, and wine.

Lyons was founded B.C. 40, and under Augustus was made the capital of Celtic Gaul. Roman baths and remains of a theatre, tombs, walls, and aqueducts still remain. The city was the scene of early Christian persecutions in the 2nd century; was ravaged by barbarians, and later, in 736, by the Saracens; and became the capital of the Burgundians in 478. It suffered severely during the religious wars of the 16th century. At first it eagerly embraced and then renounced the cause of the revolution (1789-93), suffering accordingly from the ultimately victorious revolutionists. Lyons was the birthplace of three Roman emperors—Claudius, Marcus Aurelius, and Caracalla; of Par-



Views in Lyons.

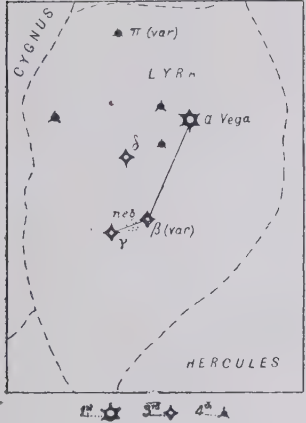
1. Hôtel de Ville. 2. Panorama from the Place Bellecour. 3. Cathedral. 4. Bourse. 5. Pont de la Guillotière and Hôtel Dieu.

mentier, who introduced the potato into France; Say (1767), the political economist; Marshal Suchet (1770); the chemist and physicist Ampère (1775); Madame Récamier (1777); Jacquard (1806), inventor of the figured pattern loom; and the painter Meissonier (1815). Lyons is the stronghold of French Catholicism. Pop. (1901) 459,099. See works for topography by Joanne (1885), and for history by Metzger (1881-5).

Lyons, GULF OF. See LIONS, GULF OF.

Lyons, EDMUND, LORD (1790-1858), English vice-admiral, born at Burton, Hants; distinguished himself in the capture of Banda Neira (1810), and in the storming of Marrack (1811); commanded in the Mediterranean (1828-35), rendering great services to the cause of Greek independence; afterwards appointed British minister at Athens, where he remained until 1849, subsequently occupying other diplomatic positions. At the outbreak of the war with Russia he became second in command in the Black Sea, and soon afterwards commander-in-chief in the same waters. Created a military G.C.B., Lyons was raised to the peerage for his services during the war (1856).

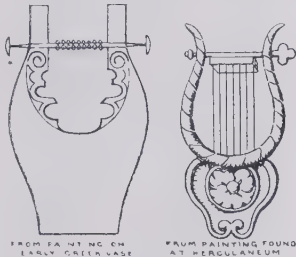
Lyons, RICHARD BICKERTON PEMELL (1817-87), first Earl Lyons, educated at Winchester and Oxford; became minister at Washington (1858), ambassador at Constantinople (1865), and at Paris (1867-87). During such crises as the Trent difficulty (1861) and the Franco-German war (1870-1) he showed firmness and discretion.



The Constellation Lyra.

Lyra, an ancient constellation, situated on the borders of the Milky Way, near Cygnus. Its primitive association with an eagle or vulture survives in the

name Vega, its largest star. Two pairs of white stars of fifth and sixth magnitudes are combined in the quadruple system of ϵ Lyrae. β Lyrae is a spectroscopic binary, varying in light from 3.4 to 4.0 in 12 days 21½ hours, and shows a remarkably fluctuating bright-line spectrum. Other variables are R V Lyrae, eclipsed once in 3½ days; γ Lyrae, a specimen of the 'cluster-type'; and R T, V, W, and Z Lyrae, all belonging to the Mira class. The wonderful 'Ring-nebula' (Messier 57) lies between β and γ Lyrae.



Lyres.

Lyre, an ancient musical stringed instrument of Eastern origin. It consisted of a hollow resonant body, from each end of which rose a gracefully curved horn-shaped arm, turning outwards at the top. The upper parts of the two arms were connected by a cross-bar, to which the strings were attached; and the latter, after passing over a bridge resting on the body, had their lower ends fastened to the bottom of the instrument. The strings, varying in number from three to eighteen, were sounded by being struck with a plectrum held in the right hand, while the fingers of the left hand checked the vibrations of those strings required to be silent. The Greek cithara was a large form of lyre.

Lyre-birds are interesting passerine birds, found only in Australia, and remarkable for the two lyrate feathers found in the tail of the male. The birds live chiefly on the ground, and their long and stout metatarsi, straight and powerful claws, and strong bill justify the Australians in their designation of 'pheasant,' although these resemblances to a game-bird are superficial only. The wings are rounded and rather short; and in the tail, in addition to the lyrate plumes, there are twelve feathers without barbules, and with widely-separated barbs, and two with very narrow webs. The lyre-bird of New South Wales and Queensland (*Menura superba*) is dull brown, with rufous throat, wings and tail coverts, and transparent notches on the outermost

tail feathers. It reaches a length of thirty-three inches. The cocks have 'playgrounds' where they display themselves before the hens. There is only one egg, and the nest is oval and domed.

Lyric (λύρα, 'lyre,' a stringed instrument used by the Greeks) is, according to its derivation, poetry sung to a musical accompaniment, as opposed to epic, spoken or recited poetry, and dramatic, which combines lyric and epic. If iambic and elegiac, originally mere forms of lyric, are excluded, lyric coincides with the more technical Greek term melic, which covers both the song (such as love-song) of an individual performer and the song of a chorus in the dithyramb and other forms of ode. Most modern lyrics are not actually sung, and various attempts have been made to define lyric in the modified sense which has resulted. The most familiar is that of the late Mr. Palgrave: 'Lyrical has been held essentially to imply that each poem shall turn on some single thought, feeling, or situation.' But this does not adequately bring out the essence of lyric, which is really in the expression of emotion, to which the elements of thought or situation, or both, are wholly subordinate. And as emotion is the condition of mind which causes and justifies that heightened and rhythmical mode of statement which is called poetry, it becomes true to say that the lyrical quality of poetry is that in virtue of which it is poetry at all. In elegiac poetry the emotional quality is balanced by one no less strong of reflection;



Lyre-bird.

in idyllic poetry by one no less strong of description. These two make up the bulk of modern poetry, together with pure lyric, in which, whatever else may be

present, the emotional quality is supreme. The distinctions here drawn are between poetical moods rather than between individual poems, which do not, of course, lend themselves to any such precise classification.

Historically speaking, lyric began with communal or folk song, in which a group of workers in the common field or spinning-house, or of revellers at the common festival, expressed to the rhythms of toil or of the dance their common and primitive emotions. The typical folk-song came in time to consist of a sentiment sung by a leader, and a refrain or burden repeated by the chorus; and this has left many traces upon the forms of lyric. But so far as the spirit of lyric is concerned, the whole tendency of modern development has been to get away from folk-song, and to substitute for the expression of a communal emotion that of an emotion which is as personal and intimate as possible. This process had been in part anticipated in Greece, where the personal lyric of Alcæus and Sappho of Lesbos and Anacreon of Teos stands side by side with the choral lyric of Pindar of Thebes and Bacchylides of Ceos, and of the great Attic dramatists, in which much of the communal element is preserved. Latin lyric, in Catullus and Horace, is mainly an exotic thing borrowed from Greece. A native Italian lyric comes to artistic form once, and once only, in the *Pervigilium Veneris* of the 2nd century A.D. Mediæval romance lyric, on the other hand, makes a fresh start from folk-song, out of which the minstrels of N. France, Provence, and Italy developed a large number of distinct types of song. These include the sonnet, the ballade, the rondeau, the rondel. Simultaneously a religious lyric grew up at the hands of the great Latin hymn-writers, such as Adam of St. Victor, and an important link between sacred and secular was found in the class of wandering scholars, who readily introduced the one to minstrelsy, the other to the cloister.

The earlier history of English lyric is obscured by the non-lyrical character of such Anglo-Saxon poetry as remains, and by the blotting out of English as a literary tongue for two centuries after the conquest. Under the early Tudors the song, in the strict sense, becomes of importance. The fashion of singing to the lute, viol, or virginals endured right through the Elizabethan period, and largely determined the character of lyric poetry. The lyric of Thomas Campion and of the innumerable and mainly anonymous writers of

the songbooks, the lyric of Thomas Lodge and Nicholas Breton, the lyric scattered through the plays and masks of Shakespeare, of Ben Jonson, of Beaumont and Fletcher, is primarily intended to be sung. Meanwhile more elaborate and artificial forms of lyric were introduced as a result of the study of European and classical poetry. Sir Thomas Wyatt and the Earl of Surrey, under Henry VIII., naturalized the sonnet. Edmund Spenser is mainly responsible for the Greek forms of ode and epithalamium, and for the pastoral convention so dear to the Elizabethan writers. Spenser is the dominant influence in English lyric until well into the 17th century, when the example of John Donne, far less musical but more intellectualized, individual, and passionate, led to the formation of a group of court poets, among whom were Thomas Carew, Sir John Suckling, William Habington, Abraham Cowley, and Thomas Randolph. Somewhat aloof from these, and with more affinities to the earlier school, stand John Milton, Andrew Marvell, and Robert Herrick. A group of religious lyrists includes the Anglican George Herbert and Henry Vaughan, and the Catholic Richard Crashaw. The transition from the imaginative lyric of Donne to the witty lyric of the restoration is represented by Edmund Waller; and the latter itself by Sir Charles Sedley, the Earl of Rochester, and John Dryden. Thereafter lyric disappears from English literature, until at the end of the 18th century the voices of William Collins and William Blake herald the second great lyrical period, which has extended from Wordsworth, Coleridge, Byron, Shelley, and Keats to the writers of our own day.

See general histories of literature and poetry. For selections, see F. T. Palgrave's *Golden Treasury of Songs and Lyrics* (1861; 1883; pt. ii., 1897); R. C. Trench's *Household Book of English Poetry* (1863, 1870); T. H. Ward's *The English Poets* (1887-94); A. H. Bullen's *Lyrics from the Song Books of the Elizabethan Age* (1888, 1891), *Lyrics from the Dramatists of the Elizabethan Age* (1891); A. H. Miles's *Poets and Poetry of the Century* (1891-97); W. Watson's *Lyric Lore* (1892); R. H. Caine's *Love Songs of English Poets* (1892); G. Saintsbury's *Seventeenth Century Lyrics* (1892); H. C. Beeching's *A Paradise of English Poetry* (1893, 1896); A. T. Q. Couch's *The Golden Pomp* (1895), *Oxford Book of English Verse* (1902); F. E. Schelling's *Elizabethan Lyrics* (1895), *Seventeenth Century Lyrics* (1899); J. C. Collins's *Treasury of Minor British Poetry* (1896); A. Mey-

nell's *The Flower of the Mind* (1897); W. E. Henley's *English Lyrics* (1897); F. I. Carpenter's *English Lyric Poetry* (1897); Stenhouse's *Illustrations of the Lyric Poetry and Music of Scotland* (1853); and E. Arber's *British Anthologies* (1899-1901).

Lys, riv., France and Belgium, rises in dep. Pas-de-Calais, and flows N.E. through Nord to form the boundary between France and Belgium. It then continues N.E. through W. and E. Flanders, and after a course of 100 m. falls into the Scheldt at Ghent.

Lysander, famous Spartan commander, was a son of Aristocritus, of the royal Heraclid house. He became prominent first in the year 407 B.C. in the Peloponnesian war, when he was sent out as navarch, or commander of the fleet. His diplomatic abilities and his genius as a commander soon ended the war. In 406 B.C. Callicratidas succeeded him in the office of navarch, which the Spartan laws forbade the same man to hold twice. On the request of the Spartan allies, they sent him out nominally under the authority of a nonentity, Aracus, who was navarch, but really with full control of affairs; and that year he captured the whole Athenian fleet of 180 ships, with the exception of twenty, at Ægospotami. He then occupied Ægina, blockaded the Piræus, and in three months Athens surrendered. About 403 B.C. he seems to have formed an idea of changing the constitution of Sparta by making the monarchy elective instead of hereditary—of course with the view of obtaining it for himself; but he failed. Then he secured the appointment of Agesilaus—who was, he thought, likely to prove a mere tool in his hands—to the monarchy, on the death of Agis (398 B.C.); but Agesilaus at once asserted himself, and took command in Asia (396 B.C.). During the war with Thebes (395 B.C.) Lysander fell in battle before Haliartus. There is a Life of him by Plutarch, while Xenophon is the other chief ancient authority.

Lysias (c. 459-c. 380 B.C.), one of the ten Attic orators, was born at Athens, though he was not an Athenian citizen, his father, Cephalus, being a Syracusan. At the age of fifteen Lysias went to Thurii in Italy, and is there said to have studied rhetoric under Tisias (c. 412 B.C.). He returned to Athens, and there lived prosperously with his brother Polemarchus until 404 B.C., when their wealth attracted the attention of the Thirty Tyrants. Polemarchus was killed, while Lysias just escaped with his life, losing most of his fortune; retaining

enough, however, to aid in the restoration of the democracy (403 B.C.). He devoted the rest of his life to writing speeches for pay. He is said to have composed over two hundred speeches, thirty-four being extant in whole or in part, of which all but two—and these two only in fragments—are court speeches. They are of great interest for the light which they throw upon Athenian legal procedure and the life of the time, and are remarkable for their perfection of style. Editions—Text: Baiter and Sauppe (1850), Cobet (1863), Weidner (1888); with notes: Shuckburgh (1882), Kocks (1887), and Morgan (1895). See Jebb's *Attic Orators* (1876), and Mahaffy's *History of Classical Greek Literature* (1880).



Lysimachia nummularia.

1. Calyx.

Lysimachia, a genus of flowering plants, order Primulaceae. They are mostly natives of the northern temperate regions, but a few species are tropical. The flowers are usually characterized by a five-cleft calyx, a five-cleft rotate or funnel-shaped corolla, and a capsule opening by valves. The commonest British species is *L. nummularia*, the herb-two-pence, creeping jenny, or moneywort, which frequents damp, shady places, such as river banks and woods. The wood loosestrife, or yellow pimpernel, *L. nemorum*, is another common British species, usually found in woods.

Lysimachus (360–281 B.C.), one of the generals of Alexander the Great, got the government of Thrace (323 B.C.), the title of king (306 B.C.), and with Seleucus defeated Antigonus at Ipsus (301 B.C.). In 291 a king of the Getæ took him prisoner, but soon restored him to liberty. In 287,

with Pyrrhus, he expelled Demetrius from Macedonia, of which Pyrrhus became king; but in 286 Lysimachus drove him out, and assumed the monarchy. He fell in battle against Seleucus on the plain of Corus (281 B.C.). Arrian, Curtius, Diodorus, and Plutarch are the chief ancient authorities.

Lysippus, famous Greek sculptor, was a contemporary of Alexander the Great, who ordered that no one except Lysippus should carve his statue. His statues differed from those of his predecessors by their slender proportions and greater grace. His works are said to have numbered 1,500, nearly all in bronze. None of them are extant.

Lystra, city of Lycaonia, Asia Minor; famous chiefly from the fact that St. Paul and St. Barnabas preached there. See Wilson's *Asia Minor* (1895), and Ramsay's *Historical Geography of Asia Minor* (1890).

Lyte, HENRY FRANCIS (1793–1847), Scottish hymn-writer, born at Ednam, near Kelso. Lyte took holy orders, and, after holding several curacies, was appointed to the charge of Lower Brixham, where he officiated (1823–44). Among his best-known hymns are *Abide with me*, *Pleasant are Thy courts above*, and *Praise, my soul, the King of Heaven*. See his *Remains*, with Memoir (1850), and Carre's *Border Memories* (1876).

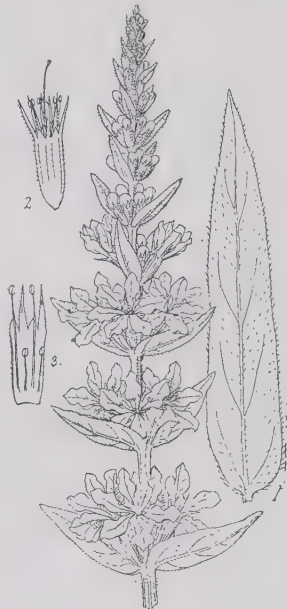
Lytham, par. and tn., Blackpool div., Lancashire, England, on riv. Ribble, 6½ m. S.E. of Blackpool; is a favourite watering-place during spring and summer. At Lytham Pool, 1 m. N.E., are a graving dock and harbour. Pop. (1901) 7,185.

Lythraceae, a natural order of plants, trees, herbs, and shrubs, most of which are natives of tropical America. The flowers are usually characterized by possessing a multipartite, tubular calyx, from the tube of which spring the stamens, a single style, and a many-seeded capsule. Among the genera are *Lythrum*, *Grislea*, *Peplis*, and *Cuphea*.

Lythrum (loosestrife), a genus of plants belonging to the order Lythraceae. They are characterized by having a cylindrical calyx with twelve parts, and a corolla of six petals. The commonest British species is *L. salicaria*, the purple loosestrife, which flowers in late summer, sending up great spikes of purple flowers. A less common species is *L. hyssopifolia*, the hyssop-leaved purple loosestrife, which is much smaller, and bears solitary flowers. Among the garden species are *L. Graefferi*, from the south of Europe, often grown in greenhouses as a hanging basket plant; and the hardy *L. alatum*, a North American species, with erect, brilliant purple flowers.

Lyttelton, chief port of Canterbury, New Zealand, on N.W. of Banks Peninsula, on E. coast of South Island. The harbour, about 10 m. long and 2 m. wide, is enclosed by steep hills, the walls of an extinct volcano. The port, artificially formed by two semi-circular breakwaters, encloses 107 acres, has a large graving dock, and the largest export trade for New Zealand. It is connected with Christchurch by a railway tunnelled through the hills. Pop. (1901) 4,023.

Lyttelton, ALFRED (1857), British statesman, was educated at Eton and at Trinity College, Cambridge, where he took honours in history and the oration prize. He was called to the bar (1881), took silk (1900), and was appointed successively recorder of Hereford (1894) and Oxford (1895). He has represented Warwick and Leamington as a Liberal Unionist since 1895, and is a member of the council of the bar. He was chairman of the Transvaal Concessions Commission, which held its inquiry in S. Africa during the latter part of 1900. From 1903–5 he was



Lythrum salicaria.

1, Lower leaf; 2, calyx; 3, section of part.

Secretary of State for the Colonies, during his tenure of which office he initiated the formation of a permanent Imperial Council, with representatives from all the self-governing colonies. A famous athlete, he has played both cricket and football for England, and was tennis champion (1882–95).

Lyttelton, GEORGE, LORD (1709-73), English statesman, was educated at Eton and Oxford, and entered the House of Commons (1730) as an opponent of Walpole. Resigning his post as a lord of the Treasury (1754), he became a Privy Councillor, and in the following year Chancellor of the Exchequer, but resigned in 1756, when he was raised to the peerage. He published *Observations on the Conversion and Apostleship of St. Paul* (1747), and a *History of Henry II.* (1764), besides some poems. His *Works* were edited by Ayscough (1776). See also Phillemore's *Memoirs and Correspondence of George, Lord Lyttelton* (1845).

Lyttelton, GEORGE WILLIAM, FOURTH BARON (1817-76), was born in London, and educated at Eton and Cambridge. Deeply interested in the education of the working classes, he took an active part in the formation of the Birmingham Midland Institute, Saltley Training College, and in the formation of night schools. Another of his special interests was the colonial empire of Great Britain, and he formed one of the 'Canterbury Association,' which settled the province of Canterbury, New Zealand—the seaport Lyttelton there being named after him. Along with Mr. Gladstone he published a volume of translations into Latin and Greek (1839); he also printed several lectures on colonial matters. Among his sons are the Right Hon. Alfred Lyttelton (1857); the Hon. Canon Edward Lyttelton (1855), appointed headmaster of Eton College in 1905; and the Hon. George William Spencer Lyttelton (1847), formerly private secretary to Mr. Gladstone, and afterwards to Earl Granville.

Lyttelton, SIR NEVILLE GERALD (1845), British soldier, was educated at Eton, and had seen considerable active service before he took up the command of the 4th Infantry Brigade in the Boer war (1899-1902). Joining the Rifle Brigade (1865), he served with that regiment in the Fenian rebellion in Canada (1866), in the Jowaki expedition (1877), and in the Egyptian campaign (1882), when he was present in the engagements at Tell-el-Mahuta, Kassassin, and Tell-el-Kebir. In the Sudan campaign, under Lord Kitchener (1898), he was in command of the 2nd Brigade, British division, and was engaged in the battle of Omdurman, or Khartum, when he was promoted to be major-general. Lyttelton served throughout the Boer war, taking part in all the operations which finally resulted in the relief of Ladysmith (1900), including the battle of Colenso and of Vaal Krantz, which he captured and occupied.

He was promoted lieutenant-general (1900), and created K.C.B. (1902). He was appointed commander-in-chief in S. Africa (1902). On the reorganization of the War Office he was made chief of the general staff (1904).

Lyttelton, THOMAS, LORD (1744-79), politician, son of the first baron, entered the House of Lords (1774), and vigorously attacked the ministerial mismanagement of the American war, at the same time denouncing the opposition. The fulfilment of his mysterious death-warning by a dream of a dove and a white lady created a great sensation at the time. He published *Poems by a Young Nobleman* (1780). The *Letters* (1780-2) once ascribed to him were probably written by William Combe.

Lyttelton, SIR THOMAS. See LITTLETON.

Lytton, EDWARD GEORGE EARLE LYTTON BULWER, BARON LYTTON (1803-73), novelist, dramatist, and politician, was born in London, and educated at Cambridge, where he won the Chancellor's medal for poetry. The first work to bring him into prominence was his novel *Pelham*, anonymously published in 1828. This brilliant picture of contemporary life won him the fame that some early poems and a fantastic romance, *Falkland* (1827), had failed to do; and its success was continued by *The Disowned* (1829), *Devereux* (1829), *Paul Clifford* (1830), *Eugene Aram* (1832), and *Godolphin* (1833). In *The Pilgrims of the Rhine* (1834) he made a more successful essay in the romance of a quasi-German type of which *Falkland* had been a tentative example; and immediately afterwards, with *The Last Days of Pompeii* (1834) and *Rienzi* (1835), showed an unsuspected power of sustaining human interest in archaeological and historical fiction. *Ernest Maltravers* (1837) and its sequel *Alice* (1838) were a return to the style of *Pelham*; and then for some years his versatility found a new outlet in the drama. Under Macready's management, and to some extent under his guidance, he had produced at Drury Lane a poetical play, *The Duchess of La Vallière* (1836), with but small success. This was now followed by *The Lady of Lyons* (1838), the only English poetical drama of the period which still holds the stage, *Richelieu* (1839), and his evergreen comedy *Money* at the Haymarket in 1840. Meantime he had achieved no mean reputation in the House of Commons, where he sat as Liberal member for St. Ives from 1831 to 1832, and for Lincoln from 1832 to 1841. He eventually returned to Parliament in 1852 as a Conservative, and rep-

resented Hertfordshire till 1866, when he was raised to the peerage. The flow of fiction from his pen continued from 1841, its most popular examples being *Zanoni* (1842), *The Last of the Barons* (1843), *Lucretia* (1847), *Harold* (1848), *The Caxtons* (1849), *My Novel* (1853), *What will he do with it?* (1859), *A Strange Story* (1862), *The Coming Race* (1871), *The Parisians* (1873), and *Kenelm Chillingly* (1873). He published several volumes of verse. The chief of these are two fairly successful satires, *The New Timon* (1846) and *Saint Stephen's* (1860); a romantic epic, *King Arthur* (1848-9); and *The Lost Tales of Milreus* (1866). His collected works were published in 37 vols. (1873-5); a *Life* of him by T. Cooper (1873); and an unfinished autobiography, edited by his son (1883).

Lytton, EDWARD ROBERT BULWER, FIRST EARL LYTTON (1831-91), son of the preceding, statesman and poet, was born in London, and educated at Harrow. He won a literary reputation by his poems under the pseudonym of 'Owen Meredith.' Previously to his succeeding (in 1873) to his father's title of Baron Lytton, he had enjoyed diplomatic experience, first as attaché, and subsequently as secretary of legation, at Florence, Paris, the Hague, St. Petersburg, Constantinople, Vienna, Copenhagen, Lisbon, and Madrid; and during this period he had published *Clytemnestra* (1855), *The Wanderer* (1859), *Lucile* (1860), *Serbski Pesme* (1861), *The Ring of Amasis* (1867), *Chronicles and Characters* (1867), *Orval* (1869), *Fables in Song* (1874). From 1874 to 1876 he was British ambassador at Lisbon, until his appointment (in the latter year) as viceroy of India in succession to Lord Northbrook. His Indian administration was rendered notable by his diplomatic services in connection with the Afghan war, by his energetic campaign against famine, and by the proclamation of Queen Victoria as Empress of India. He was responsible for domestic reforms of a far-reaching character, particularly in fiscal matters and in the ordering of the civil service. He was created Earl of Lytton in 1880. After his return to England he published his father's unfinished biography (1883); *Glenavertil*, a narrative poem (1885); and *After Paradise* (1887). He was appointed (1887) ambassador at Paris, where he died suddenly. As a poet, his work is more distinguished by brilliancy than by any deeper quality. He is at his best in his lightest vein, as in *Fables in Song*, or the posthumously published *King Poppy* (1892).

M

M is the lip nasal; the mouth passage is closed by the lips, and the breath passes through the nostrils. It is closely related to *n* and *ng*. Final *m* shows a marked tendency to become silent in some languages; the history of the Latin accusatives supplies an illustration. The form *M* is more symmetrical than that of the early Semitic original. The variations *m* and *μ* have been influenced by alteration in the point of commencement of the writing. The upper part of *h* corresponds to *M*; the lower curve is an addition (cf. *γ* from *γ*). The Semitic *mēm*, Gr. *mū*, means 'water.'

M., a thousand (mille); *marquess*; member; monsieur.

M.A., Master of Arts.

Maal. See AASEN, IVAR.

Maartens, MAARTEN (1858), pseudonym of Joost Marius Willem van der Poorten-Schwartz, novelist, born at Amsterdam, and educated partly in England. His first book, *The Sin of Joost Aveilingh* (1889), brought him success as a delineator of Dutch

founded in the 6th century. South of the town are the tuff quarries of Petersberg, quarried since Roman times; they have yielded many fossils, including saurians. Glass, pottery, and carpets are manufactured. Maastricht was, till 1871-8, one of the strongest fortresses in Europe, and was besieged by the Spaniards in 1576 and 1579, by the Prince of Orange in 1632, by the French in 1673, 1748, and 1794, and by the Belgians; capitulating in every case except the last. From 382 to 721 Maastricht was a bishop's see. Pop. (1899) 34,220.

Mab, QUEEN, in the poets of the 16th century, is queen of the faeries and consort of Oberon; but in *Midsummer Night's Dream* Shakespeare calls the queen of fairyland Titania. Drayton in his *Nymphidia* and Herrick in the *Hesperides* give this position to Mab. Compare *Romeo and Juliet* (I. 4). The being who presides in Shelley's poem of *Queen Mab* has very little in common with her.

Maba, a genus of tropical evergreen trees and shrubs belonging to the order Ebenaceæ. They usually bear dioecious flowers, more or less campanulate in form. They are easily grown in a peaty compost in stove temperature.

Mabillon, JEAN (1632-1707), French ecclesiastical historian, born at St. Pierremont (Ardennes), and entered the Benedictine order (1654). Out of a controversy with De Rançé, a Trappist, arose his *Traité des Etudes Monastiques* (1691). But his chief works are *De Re Diplomatica* (1681), *Acta Sanctorum Ordinis Benedicti* (9 vols. 1668-1701), and *Annales Ordinis Benedicti* (6 vols. 1703-39). See E. de Broglie's *Mabillon* (1888).

Mabingion, the collection of Welsh tales contained in *The Red Book of Hergest*, edited and translated into English by Lady Charlotte Guest (1839-49; new ed. 1902). Four out of the twelve tales show a decided affinity with early Irish myth, and one of them, the story of Branwen, has been strongly affected by northern influences. These tales are non-Arthurian. There are five Arthurian stories contained in the collection; and of these, two—*Kilhwch and Olwen* and *The Dream of Rhonabwy*—have no parallel in continental Arthurian literature. The other three—*Geraint, The Lady of the Fountain*, and *Peredur*—correspond respectively to the *Erec, Chevalier au Lion*, and *Perceval* of Chrétien de Troyes. It has been authoritatively stated that the French poems were the direct source of the Welsh tales; it has

been equally dogmatically affirmed that the Welsh tales are the direct source of the French poems. Probably the Welsh stories represent genuine popular versions of legends which had their origin on insular ground, and were redacted under the influence of the more elaborate and literary form due to Chrétien. The best translation is that into French by J. Loth (1889).

Mably, GABRIEL BONNOT DE (1709-85), French philosophical historian, born at Grenoble; forsook a Jesuit college to become (1742) secretary to Cardinal de Tencin, minister for foreign affairs to Louis xv.; but ere long he quarrelled with the cardinal, and retired. Previously a supporter of absolute monarchy, he now pleaded for simplicity and equality. Works: *Entretiens de Phocion* (1763); *Parallèle des Romains et des Français* (1740). See G. Guerrier's *L'Abbé de Mably* (1886).

Mabuse, JAN, properly YENNI GOSSAERT (c. 1470-c. 1537), a Flemish painter, was born at Maubeuge (Mabuse), and entered the painters' guild of St. Luke at Antwerp in 1503. His earlier pictures, such as the *Adoration* at Castle Howard, Yorkshire, are in the style of the early Flemish school. His visit to Italy (1508) first brought Flemish painting under the influence of Michael Angelo, Leonardo, and Raphael. Among his best-known works are *St. Luke painting the Virgin*, now at Prague; *The Children of Christian II. of Belgium*, now at Hampton Court; *Adam and Eve*, now at Hampton Court; and several *Madonnas*, in London, Paris, and Berlin.

Mac, a prefix in modern Irish and Gaelic signifying 'son,' as MacDonald, son of Donald. But there are numerous historical uses of the prefix in the sense of 'great,' evidently a corruption of the 'mag' in *magnus*. (See SCOTTISH CLANS.) Mac (abbrev. M^c or M[']) has its equivalent in the Norman Fitz, the Irish O', and the Welsh Map or Ap.

M'Adam, JOHN LOUDON (1756-1836), inventor of the process of roadmaking known as 'macadamizing,' was born at Ayr, Scotland. In 1810 he made experiments in roadbuilding, and concluded that small, hard, broken stones should be used in layers gradually consolidated by the passage of traffic. At Bristol he put his theory into practice (1815), and (1827) was made general surveyor of roads, and granted £10,000. See Smiles's *Lives of the Engineers*, vol. iii. (1874).



Maarten Maartens.

(Photo by Elliott & Fry.)

manners, and was followed by, amongst others, *God's Fool* (1893)—regarded as his best—*An Old Maid's Love* (1891), *A Question of Taste* (1892), *The Greater Glory* (1894), *My Lady Nobody* (1895), *Some Women I have known* (1901), *My Poor Relations* (1903), *Dorothea* (1904), and *The Healers* (1905). He has also written a one-act play, *The Jailbird* (1904).

Maas. See MEUSE.

Maastricht, or MAESTRICHT, tn., Netherlands, cap. of prov. Limburg, on l. bk. of Maas, 19 m. by rail N. by E. of Liège. The church of St. Servatus was

M'All Mission (*Mission Populaire Évangélique de France*), founded in 1872 by Dr. R. W. M'All (1821-93), a Congregational minister in Paris. At M'All's death it had 136 centres in Paris and other towns, and auxiliaries in England, Scotland, and America.

Macao, seapt. tn., on a peninsula of Hiang-shan I., off the coast of Kwang-tung, China; has been a Portuguese possession since the 16th century, and is 8 m. in circuit. Portuguese sovereignty was not recognized by China until 1887. The trade has declined with the rise of Hong-kong. The imports amount to about £1,500,000, and the exports (chiefly opium) to £1,250,000. The old Collegiate church of the Jesuits is the most striking architectural feature. The town is notorious for its gambling houses. Pop. (1896) 78,627.

Macaroni is a preparation of flour, usually made from hard Italian wheat. The flour is made into a thick paste, which is pressed through holes in metal plates, or stamped into various shapes, and heated and dried. Macaroni is highly nutritious, being formed chiefly of gluten. In cooking macaroni, it must not be soaked or even washed with water beforehand, but must in all cases be plunged into water which is absolutely boiling. Plenty of water should be allowed—a gallon to a pound of macaroni—and this should be liberally salted. It requires to be boiled from twenty to thirty minutes. Mrs. Janet Ross, in her *Leaves from our Tuscan Kitchen* (1899), gives interesting recipes.

Macaroni, a London dandy of the 18th century; a member of the Macaroni Club, which sought to introduce foppish elegancies in dress and bearing.

Macaronic Verse, verse composed partly in Latin and partly in words taken from other languages with Latin terminations added, as in Burke's hexameter, 'Piper erat fatus, qui tegmen brownum habebat' ('There was a fat piper who had a brown coat'). The Benedictine Teofilo Polengo (otherwise Martin Cocai) first used it on a large scale in his *Maccaronea* (1517). Drummond of Hawthornden's *Polemo-Middivia* (1633) is the best known example in English. See Sandys's *Spectens of Macaronic Poetry* (1831), Delapierre's *Littérature Macaronique* (1856), Morgan's *Macaronic Poetry* (1872), and Blümlein's *Maccaronische Gedichte* (1900).

Macarsca, or MAKARSKAR, seapt. in Dalmatia, Austria, 38 m. E.S.E. of Spalato, opposite Brazza; is noted for wine. Pop. (1900) 11,016.

Macartney, GEORGE, FIRST EARL OF (1737-1806), British administrator and diplomatist; was Chief Secretary for Ireland (1769-72); governor of Caribbean Is. (1775-9), of Madras (1780-6), and of the Cape of Good Hope (1796-98). He was special envoy to St. Petersburg, and concluded a commercial treaty (1764); plenipotentiary to China (1792-94); and went to Italy (1795). See *Life* by Sir John Barrow (1807).

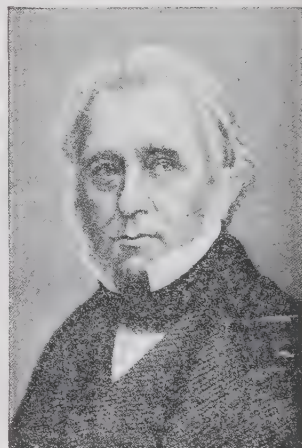
Macartney, SIR HALLIDAY (1833), born at Dundrennan, Kirkcudbrightshire, Scotland. After serving (1856) in the Crimea, and in the Chinese war (1860), when he was present at the storming of the Taku forts, he in 1862 helped General Gordon to quell the Taeping rebellion, and was director of a military arsenal at Nanking (1864-76). After that he became English secretary to the Chinese legation in London.

Macassar, fort. seapt., Celebes, Dutch E. Indies, on s.w. coast; exports rice, coffee, rubber, tortoiseshell and pearls, cocoa oil, and Macassar oil. Its total trade is about £1,500,000 annually. Pop. 18,000.

Macaulay, THOMAS BABINGTON, FIRST BARON (1800-59), English historian, born at Rothley Temple, Leicestershire, was the son of Zachary Macaulay, whose name is associated with the abolition of slavery in the W. Indies. Between 1823 and 1824 he wrote frequently for Knight's *Quarterly Magazine*—e.g. the poems 'Ivry' and 'Naseby'; and in 1825 he began to contribute his famous essays to the *Edinburgh Review*, the first being the essay on 'Milton.' In 1828 he was made a commissioner of bankruptcy, holding the office until it was abolished three or four years later. In 1830 he was elected to Parliament for Calne. His first speech on the Reform Bill (March 1831) put him in the front rank of orators. His appointment first as commissioner, then as secretary, of the Board of Control, followed in 1832. *Friendship's Offering* for 1833 contained his spirited poem 'The Armada.' In 1833 he accepted the post of legal adviser to the Supreme Council of India. After his return home he was elected M.P. for Edinburgh in 1839, and soon afterwards entering the cabinet as Secretary of State for War. *The Lays of Ancient Rome* were published in 1842. But three years before, he had begun *The History of England from the Accession of James II.* On the return of the Whigs to power in 1846 he again entered the cabinet, as Paymaster-general of the Forces. His rejection by Edinburgh in the following year, on account of his support of the Maynooth grant, practically closed his

political career. November 1848 saw the publication of the first two volumes of his *History*. Thirteen thousand copies were bought up in less than four months after publication. Between 1853 and 1859 he contributed a series of masterly biographies to the eighth edition of the *Encyclopædia Britannica*. The third and fourth volumes of his *History* were given to the world in 1855. A posthumous volume, bringing it down to the death of William III., was edited by his sister, Lady Trevelyan, in 1861. Macaulay was buried in Poets' Corner, Westminster Abbey.

As a historian, Macaulay has been justly charged with want of accuracy. His Whig propen-



Lord Macaulay.

sities and a love of sweeping statements led him at times to disregard strict justice. On the other hand, he succeeded in his aim of making history as interesting as a novel. He has also the merit of having introduced a new style into English literature. In all his writings he exhibits a power of picturesque narrative and a wealth of allusion which have never been surpassed.

Works, ed. by Lady Trevelyan (8 vols. 1866); *History of England*, with Memoir by Milman (8 vols. 1858-62); *Speeches* (1854); *Miscellaneous Writings*, ed. by Ellis (2 vols. 1860); *Selections*, ed. by G. O. Trevelyan (1876). See *Life*, by G. O. Trevelyan (2 vols. 1876) and Morrison (English Men of Letters, 1882); *Public Life*, by Arnold (1862).

Macaw, the name of certain South American parrots, belonging to the genus *Ara*, and to other related genera. All are gorgeously coloured, and possess a peculiarly harsh and screaming voice. They are of large size.

Macaw Tree (*Acrocomia sclerocarpa*), also called GRU-GRU, a palm, native to S. America and the W. Indies. It bears pinnate leaves, twelve feet and more in length, and its fruit yields an oil largely imported into Britain as palm oil, and much used in soap manufacture.

Macbeth, *mormaer* of Moray, having murdered Duncan, king of the Scots, near Elgin (1040), succeeded to the throne. Duncan's son, Malcolm, who fled to England, invaded Scotland, routed (1057) Macbeth, and killed him at Lumphpan in Aberdeenshire. See Robertson's *Scotland under her Early Kings*.

Maccabees, a famous Jewish family, descendants of Mattathias, though the more accurate term for the family is Hasmonæans or Asmonæans, derived from Hashmon, the name of the great-grandfather of Mattathias. See further under ISRAEL.

Maccabees, BOOKS OF THE. Of the five apocryphal writings embraced under this name, two (I. and II. Macc.) are accepted as canonical by the Roman Catholic Church. (1.) I. MACCABEES deals with the period 175-135 B.C., and narrates the origin and progress of the Jewish revolt against Syria, and the exploits of Judas, Jonathan, and Simon. It was written in Hebrew, probably early in the 1st century B.C., and shortly afterwards translated into Greek. Its truly religious, while very reserved, spirit gives it every appearance of general trustworthiness. (2.) II. MACCABEES begins its history one year previous to that of I. Maccabees, but covers only fifteen years. It adds little of value to our knowledge. Its Greek is pure, but the work is full of bigotry and of the marvellous, and was written, probably by a Pharisee, about the beginning of the Christian era. III. MACCABEES relates two incidents—viz. Ptolemy IV. Philopator's attempt to desecrate the sanctuary (217 B.C.), and his attempt to destroy the Jews. The work bears evidence of having been written (in Greek) by an Alexandrian Jew. IV. MACCABEES has for its theme 'the supremacy of pious reason over the passions,' and is a philosophical prelection, influenced by Greek thought, especially Stoicism, and illustrated from Maccabean history as found in II. Maccabees. The book has been attributed, on quite inadequate grounds, to Josephus, and is generally assigned to the 1st Christian century. V. MACCABEES contains a summary of Jewish history covering practically the last two centuries B.C., and has been compiled from I. and II. Maccabees and Josephus. See Grimm's *Commentary on I.,*

II., III., and IV. Maccabees (1853-57); I. and II. in *Speaker's Com.* (Rawlinson); I. in *Camb. Bible*; Cotton's *The Five Books of the Maccabees in English* (1832).

MacCarthy, DENIS FLORENCE (1817-82), Irish poet, born in Dublin. He wrote poems for the *Nation* and the *Irish Catholic Magazine* (1845). In 1864 he settled in London, but died at Blackrock, near Dublin. Works: *Poems* (collected 1850 and 1884); *Ode on the Centenary of Thomas Moore* (1880). Translations—from the Spanish of Calderon—*Justina* (1848); *Love* (1861); *Mysteries of Corpus Christi* (1867).

MacCarthy, JUSTIN (1830), Irish novelist, journalist, and politician, was born at Cork; was reporter for *Morning Star* (1860), subsequently editor (1864-8). Since 1870 he has been leader writer on the *Daily News*. Of novels he has published nearly a score—e.g. *Dear Lady Disdain* (1875), *The Dictator* (1893), four in collaboration with Mrs. Campbell-Fraed, and a volume of essays, *Con Amore* (1868). He has also written lives of *Sir Robert Peel* (1890), *Gladstone* (1898), *Leo XIII.* (1895), and *A History of Our Own Times* (1882-97 and 1905), his chief work; also *A History of the Four Georges and William IV.* (1884-1901), *Epoch of Reform* (1874), *Modern England* (1899), and *Rome in Ireland* (1904). An Irish M.P. for seventeen years (Co. Longford, Londonderry, N. Longford), he was chairman of the Home Rule party (1890-6). See his own *Reminiscences* (1899).

MacCarthy, JUSTIN HUNTLY (1860), dramatist, novelist, and historian, son of the preceding, has travelled much in Europe, Egypt, Palestine, and the United States. His publications include *A History of England under Gladstone* (1885); *Sketches of Irish History* (1887); translations of the *Rubaiyat* of Omar Khayyam, and *The Thousand and One Days*; and several plays.

MacCheyne, ROBERT MURRAY (1813-48), Scottish divine, was born in Edinburgh. An account of a journey to Palestine was embodied by MacCheyne and Andrew Bonar in the *Narrative of a Mission of Inquiry to the Jews* (1842). MacCheyne is remembered as a preacher at Dundee (1836-43) rather than as a writer. See *Memoirs and Remains*, by Andrew Bonar (1843 and 1892); and *Life* by Jean L. Watson (1882).

Macchiavelli. See MACHIAVELLI.

McClellan, GEORGE BRINTON (1826-85), American general, was born at Philadelphia. He served in the Mexican war (1847); was instructor at West Point, explorer of Red River and Texas,

and finally (1855) sent to observe the Crimean war, of which he published a brilliant report (1861), *The Armies of Europe*. Joining the North on the outbreak of the civil war, he was instrumental in winning over W. Virginia; then he organized the army of the Potomac, with which he took Yorktown (1862) and threatened Richmond. He was forced back by Lee in the 'seven days' battles,' but finally defeated Lee at Antietam (1862). After that Lincoln relieved him of the chief command, and in 1864 he resigned his commission. See *McClellan's Own Story* (1886).

Macclesfield, munic. bor. in Cheshire, England, 12 m. S.E. of Stockport; chief silk-manufacturing centre in England, producing brocades, plain and fancy silks and satins, ribbons, gimps, and fringes. Silk-throwing is an important branch of the industry. Pop. (1901) 34,624.

McClintock, SIR FRANCIS LEOPOLD (1819), British admiral and Arctic explorer, born at Dundalk, Ireland. He served in four Arctic expeditions. The second (1850) found traces of Franklin; the third (1852) relieved the M'Clure expedition; the fourth (1857) ascertained the fate of Franklin. In 1859 he published *The Fate of Sir John Franklin*.

McClure, SIR ROBERT JOHN LE MESURIER (1807-73), British vice-admiral, born at Wexford, Ireland. He served in Arctic expeditions under Back and Ross (1836-7), commanded the Franklin search expedition of 1850, and accomplished the North-west Passage (1851).

McClure, SAMUEL SIDNEY, (1857), American publisher, was born in Antrim, Ireland. He became (1882) editor of the *Wheelman* (Boston), and in 1884 established in New York the first newspaper syndicate, and in 1899 the M'Clure Phillips company of publishers. In 1893 he began the well-known *M'Clure's Magazine*.

M'Clure's Magazine, American monthly periodical, founded in 1893 by S. S. M'Clure. The *Life of Napoleon* and *Life of Lincoln*, published in M'Clure's, created great public interest; while Miss Tarbell's 'History of the Standard Oil Company' has been another important enterprise of this magazine. Among its contributors have been Robert Louis Stevenson, Dean Farrar, 'Anthony Hope,' Henry Drummond, Elizabeth Stuart Phelps, Rudyard Kipling, and J. M. Barrie; and Stephen Crane was one of the writers whom M'Clure's 'discovered.'

MacColl, MALCOLM (1838), Scottish divine, was born at Glenfinnan, Inverness. He was chaplain to the British embassy in St.

Petersburg (1862-3), rector of St. George's, London, and in 1884 canon of Ripon. He is the author of *Is there not a Cause?* (1868); *The Eastern Question* (1877); *Reasons for Home Rule* (1886); and *The Ober-Ammergau Passion Play* (1870).

MacCormac, SIR WILLIAM, (1836-1901), Irish surgeon, was born in Dublin. He was consulting surgeon in Belfast Royal Hospital, then surgeon-in-chief to the Anglo-American ambulance during the Franco-German war (1870-1), and later lecturer at St. Thomas's, London, and consulting surgeon to the French Hospital. He was an authority on gunshot wounds. He saw active service in Cape Colony and Natal (1899-1900), and in 1901 was appointed sergeant-surgeon to the king. Publications: *Antiseptic Surgery* (1880), *Notes and Recollections of an Ambulance Surgeon* (1880), *Hernia* (1886), and *Surgical Operations* (1885-9).

M'Cormick, CYRUS HALL (1809-84), American inventor, was born at Walnut Grove, Virginia. His reaping machine, first used in 1831, was perfected and patented in 1834.

M'Cosh, JAMES (1811-94), Scottish philosopher, born at Carskeoch, Ayrshire. In 1835 he became minister at Arbroath, removing (1838) to Brechin, and helping to organize the Free Church of Scotland (1843). At Brechin he published his *Method of the Divine Government, Physical and Moral* (1850), which won him the professorship of logic at Queen's College, Belfast. In 1868 he was made president of Princeton College, New Jersey, resigning (1888). His *Examination of Mr. J. S. Mill's Philosophy* (1866), *Realistic Philosophy* (1887), *Psychology of the Motive Powers* (1887), and *First and Fundamental Truths* (1889) are written from the standpoint of the Scottish intuitional school.

M'Crie, THOMAS (1772-1835), Scottish preacher and ecclesiastical historian, was born at Duns, Berwickshire. Becoming a minister of the Church of Scotland, he opposed the effort to dissociate the church from the civil authority. He wrote accounts of the reforming movements in Scotland, in Italy (1827), and in Spain (1829). The first of these, cast in the form of the *Life of John Knox* (1812), is still a standard book. The special value of M'Crie's work lay in his impartiality, and in his wide grasp of the principles underlying the reformation period. See *Life* by his son (1840), also *Memoir* by Crichton (1854).

M'Culloch, HORATIO (1805-67), Scottish landscape painter, was

born at Glasgow; at first decorated snuff-boxes and illustrated books. In 1829 he exhibited a *View on the Clyde*, and in 1836 became an A.R.S.A., and in 1838 an R.S.A. Chief pictures: *Loch-an-Eilan*; *Inverlochy Castle*; *Ben Venue*; *Moonlight—Deer Started*; *Mist Rising off the Mountains*.

M'Culloch, SIR JAMES (1819-93), colonial politician, was born in Glasgow, and settled in Melbourne, Australia. He was four times prime minister of Victoria (1863-8, 1868-9, 1870-1, and 1875-77); passed a land bill, and, after a long struggle, introduced a protective tariff.

MacCulloch, JOHN (1773-1835), British geologist, was born in Guernsey. His principal work is *System of Geology* (1831). He specialized in the geology of Scotland, drawing up a *Geological Map of Scotland* (1836).

M'Culloch, JOHN RAMSAY (1789-1864), Scottish statistician and political economist, was born at Whitthorn, Wigtownshire. He delivered lectures in London (1824), afterwards embodied in *Principles of Political Economy* (1825), a standard work of the day. M'Culloch was an ardent disciple of Ricardo and Adam Smith, whose works he edited. But he was a well-informed and accurate compiler rather than an original contributor to economic science. See biographical notice by Reid, prefixed to *Dict. of Commerce* (1869).

MacCunn, HAMISH (1868), Scottish musical composer, born at Greenock. In 1886 his overture, *Land of the Mountain and the Flood*, was produced at the Crystal Palace. He was professor of harmony (1888-94) at the Royal Academy of Music, and (1892) conductor of the Hampstead Conservatoire Orchestral Society. His chief works are:—Operas—*Jeanie Deans* (Edinburgh, 1894), *Diarmid*, libretto by Marquis of Lorne (1896); cantatas—*Lord Ullin's Daughter*, *Queen Hynde of Caledon*; besides numerous overtures, songs, part songs, Scottish dances, and pieces for 'cello and pianoforte.

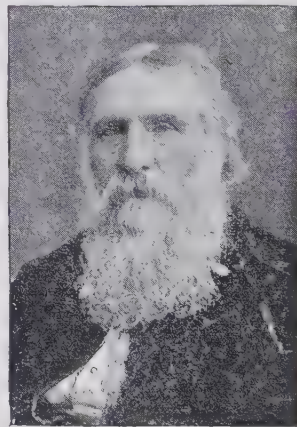
Macdonald, SIR CLAUDE MAXWELL (1852), British soldier and diplomatist, served in Egypt (1882) and in the Suakin expedition (1884-5), and was wounded at Tamai. From 1896-1900 he was minister at Peking, and commanded the legation quarters when besieged by the Boxers (1900). He was then appointed British minister to Japan, and in 1905 first ambassador to that country.

MacDonald, ETIENNE JACQUES JOSEPH ALEXANDRE (1765-1840), Duke of Taranto and marshal of France, near relative of Flora MacDonald, was born at San-

cerre (Cher). Crossing the Waal on the ice, he captured the Dutch fleet—a feat unique in history (1794-5). He saved the situation in Italy, fighting Suvarov for three days till relieved by Moreau (1799). In 1800 he swept the Austrians before him in the Splügen, but in 1804-9 was in disgrace through defending Moreau. However, he broke the Austrian centre at Wagram (1809), for which he was made marshal. Defeated by Blücher on the Katzbach (1813), he fought grandly at Leipzig.

MacDonald, FLORA (1722-90), Scottish heroine, was born at Milton, S. Uist. At Benbecula, Hebrides (1746), when Charles Edward arrived after Culloden, she obtained a passport for herself, man-servant, 'Betty Burke, an Irish spinning-maid' (i.e. the prince), and landed the Pretender at Kilbride, near Monkstadt, whence he gained Portree and Raasay House, eventually escaping to Brittany from Borradaie. For this she was imprisoned in the Tower of London, but was pardoned (1747). See *Life* by Macgregor (new ed. 1901), and Jolly's *Flora MacDonald* (1886).

MacDonald, GEORGE (1824-1905), Scottish novelist and poet, born at Huntly, Aberdeenshire. After a sojourn in London his weak health constrained him to settle at Bordighera in Italy.



George MacDonald.

(Photo by Elliott & Fry.)

Dr. MacDonald published *Poems* (1857), and the striking *Phantasies, a Faerie Romance* (1858). His knowledge of the north of Scotland is conspicuous in the novels *David Elginbrod* (1862), *Alec Forbes of Howland* (1865), *Robert Falconer* (1868), *Malcolm* (1875), and *The Marquis of Lossie* (1877). Others are *Annals of a Quiet Neighbourhood* (1866); *Guild Court* (1867); *Wilfred*

Cumbermede (1871); *St. George and St. Michael* (1875); *Thomas Wingfold, Curate* (1876). The author's dogmatism, often painfully persistent, occasionally intensifies the intrinsic interest of his problem, as in *Lilith* (1895). His children's poems and stories are popular. See Johnson's *George Macdonald* (1905).

Macdonald, SIR HECTOR ARCHIBALD (1852-1903), British soldier, was born in Ross-shire, Scotland. Enlisting as a private, he saw service in the Afghan war (1879-80), and was promoted from the ranks. In 1881 he served in the Boer war, and was present at Majuba Hill. Between 1885 and 1898 he took part in most of the Egyptian Sudan campaigns, being

Macdonald, JOHN (1779-1849), 'Apostle of the North,' was born at Reay, Caithness. He preached in the Highlands until his appointment to the Gaelic chapel, Edinburgh (1807); and while parish minister of Urquhart, Caithness (1813-43), he did mission work in Ross, Cromarty, St. Kilda, and Ireland. At the Disruption of 1843 he joined the Free Church. See *Diary of Visits to St. Kilda* (1830), and *Gaelic Verses* (1848).

Macdonald, SIR JOHN ALEXANDER (1815-91), Canadian statesman, was born in Glasgow, but was taken to Canada in 1820. He entered the Canadian House of Assembly in 1844, and in 1856 became leader of the Conservative

record extending from 1865 to 1902, when he returned to England and became a member of the India Council. In September 1902 he was 'lent' by the Secretary of State for India, and although a Roman Catholic, a Liberal, and a Home Ruler, was appointed under-secretary for Ireland by the then Unionist Government. His activity in furthering 'devolution' provoked the resentment of the Ulster members, and culminated in the resignation of Mr. Wyndham, Chief Secretary for Ireland. Under the Liberal government it is expected that Sir Antony MacDonnell will have scope for working out the principle of ruling Ireland according to Irish ideas.



present at the battles of Toski, Tokar, Abu-Hamed, Abarra, and Omdurman, in the last of which he especially distinguished himself. After the death of General Wauchope at Magersfontein (Dec. 11, 1899), Macdonald was given the command of the Highland Brigade. He was engaged in the operations that led to the capture of Cronje and his force at Paardeberg (Feb. 27, 1900). He commanded the Southern and Belgium district, India (1901), and in 1902 was transferred to Ceylon. He subsequently committed suicide in Paris. A national monument to his memory has been erected at Dingwall.

party, and premier. Macdonald was an advocate of the federation of the British North American colonies, and he triumphed in 1867, when the Dominion of Canada was created, he being its first premier. He held office till 1873, and came back into power in 1878 as a protectionist, and remained in power till his death. See *Life* by J. Pope (1894).

Macdonald, SIR JOHN HAY ATHOLE. See *KINGSBURGH*.

MacDonnell, SIR ANTONY PATRICK, P.C. (1902), G.C.S.I. (1897), K.C.V.O. (1903), under-secretary to lord-lieutenant of Ireland, born 1844, is a distinguished civil servant with a brilliant Indian.

M'Dougall, WILLIAM (1822-1905), Canadian statesman, was born at Toronto. He was minister of public works (1867); puisne judge in the province of Quebec (1887); and promoted the union of British N. America.

M'Dowell, IRVIN (1818-85), American general, was born at Columbus, Ohio. In the civil war he commanded the Federal troops when defeated at Bull Run (1861), and was retired from active service (1862). He was afterwards acquitted of blame by a court of inquiry, and in 1865 was appointed major-general.

Macduff, Thane or Earl of Fife, who, according to tradition,

succeeded in defeating Macbeth at the battle of Lumphanan (1057), and assisted in placing Malcolm Canmore on the throne. See Shakespeare's *Macbeth*.

Mace, an ornamental staff which certain judges, magistrates, and high official persons, such as the Lord Chancellor and the speaker of the House of Commons, are entitled to have borne before them as a symbol of authority. In 1354 Edward III. granted to the city of London the right to have maces of gold or silver, or silvered or garnished with the sign of the royal arms, borne before the lord mayor. As to the speaker's mace, Sir Erskine May says: 'The present mace dates from the restoration of Charles II., when a new mace was ordered May 21, 1660. After the death of Charles I., in 1648, a new mace had been made, which was the celebrated "bauble" taken away by Cromwell's order on April 19, 1653, and restored on the 8th July of the same year.'—*Parliamentary Practice*, 9th ed., p. 152, note.

Mace, the large branched aril of the nutmeg, is of a deep orange or scarlet colour, and of a fleshy consistence when fresh. It is commonly sold in the dry state, when it takes on a dull yellowish colour. It contains about 8 per cent. of oil of nutmeg.

Mace, JEM (1831), English pugilist, born at Swozzham, Norfolk; forms a link between the old prize-fighters and the modern exponents of glove contests. His first fight was in 1855. In January 1862 Mace defeated Tom King, but was himself subsequently beaten by King.

Macedonia, or **MACEDON**, country to the N. of ancient Greece. On the accession of Philip (359 B.C.) it reached down to Mt. Olympus in Thessaly. The inhabitants were no doubt of Greek race, and their kings claimed descent from the royal family of Argos; but the Greeks regarded them as an alien people. The monarchy was weak until Philip became king. The secret of his success was his organization of a regular standing army. From his time until its conquest by Rome (168 B.C.) Macedonian history is part of that of Greece. The Macedonians were a vigorous, warlike race; like other northern nations, they were hard drinkers. Macedonia has become notorious in recent years as the scene of revolts against Turkish rule. The Congress of Berlin in 1878 made certain stipulations as to autonomous institutions for the Macedonian Christians. In 1875 the Bulgarians fomented a revolt, and their government proposed a plan of reform. In 1896 bands of irregulars were formed,

and constant conflicts with the Turkish soldiery took place. In 1903 several bloody encounters occurred. In December 1905 the powers made a naval demonstration against Turkey to enforce their scheme of financial control in Macedonia. See **EASTERN QUESTION**.

Maccio, cap. of Alagoas, Brazil, 125 m. S.S.W. of Pernambuco, at a short distance from its port, Jaragua, on the Lagoa do Norte. There are cotton and sugar mills. Pop. 30,000.

Macerata, tn., cap. of prov. of same name, Italy, 22 m. S.W. of Ancona. Its cathedral and university date from 1290. The chief manufactures are glass, pottery, and chemicals. Pop. (1901) 22,473.

Macewen, SIR WILLIAM (1848), Scottish physician, was born in Bute. He was for some years lecturer on surgery at the Royal Infirmary School of Medicine, Glasgow, and since 1892 has been professor of surgery at Glasgow University. His speciality is operations on the brain. His principal works are *Osteotomy* (1880), and *Diseases of the Brain and Spinal Cord* (1893).

Macfarren, SIR GEORGE ALEXANDER (1813–87), English musical composer and writer, born at London. He became professor of the Royal Academy of Music (1837), and principal (1876). In 1875 he was appointed professor of music at Cambridge University. In 1830 he produced his first important orchestral work, a symphony, *Chevy Chase* (written in one night, 1836) was produced at Leipzig by Mendelssohn (1843); *May Day* (cantata) in 1857, Costa conducting; *Robin Hood*, his greatest opera, in 1860, in which year he became blind. His first oratorio was *St. John the Baptist*, performed 1873. He was founder of the Handel Society (1844). He wrote on harmony and counterpoint, and *Musical History* (1885). See *Life* by Banister (1891–2).

MacGillivray's Reeks, mts., Co. Kerry, Ireland, on shores of Lakes of Killarney. The principal peak is Carratua or Carratuohill (3,414 ft.), the loftiest peak in Ireland.

Macgillivray, JAMES PITTENDREIGH (1856), Scottish sculptor and artist, born at Port Elphinstone in Aberdeenshire; studied under Brodie. He worked for some time at ornamental moulding and at painting, but since 1883 has devoted himself to sculpture. In 1882 he became a member of Glasgow Art Club, and in 1892 A.R.S.A. He has executed a statue of Burns for Irvine.

MacGillivray, WILLIAM (1796–1852), Scottish naturalist,

was born at Old Aberdeen, and was successively assistant to the professor of natural history at Edinburgh (1823), curator of the Royal College of Surgeons (1831–41), and professor of natural history and lecturer on botany at Marischal College, Aberdeen (1841). He is best known for his *History of British Birds* (1837–52).

M'Gill University, Canada, was founded (1821) on the endowment of James M'Gill, at Montreal. The enlightened administration of Sir William Dawson raised it during the last quarter of the 19th century to a commanding position.

MacGregor, JOHN (1825–92), Scottish traveller and philanthropist, known as 'Rob Roy MacGregor.' From 1865 he navigated in his *Rob Roy* canoe several rivers of France, Germany, Norway, and Sweden, besides travelling down the Red Sea and through part of Palestine, and wrote *A Thousand Miles in the Rob Roy Canoe* (1866). MacGregor took an active part in promoting the schemes of Lord Shaftesbury and other philanthropic efforts.

M'Gregor, ROBERT. See **ROB ROY**.

M'Guckin, BARTON (1853), tenor vocalist, a native of Dublin, was in 1871 first tenor at St. Patrick's Cathedral there. As a concert singer he sang at Dublin and at the Crystal Palace, London. He sang at festivals at Hereford and Bristol (1879), at Norwich (1881), and at Leeds (1886). From 1880 (when he began opera singing as Thaddeus in the *Bohemian Girl*) till 1896 he was a member of the Carl Rosa Opera Company.

Machærodus, a formidable carnivorous animal, with canine teeth from eight to twelve inches in length, larger than those of any other known animal. It was contemporaneous with cave-man in the south of England, and it is well represented in Pleistocene strata all over Europe and America. It appears to have been about the same size as the lion.

Machiavelli, or **MACCHIAVELLI**, NICCOLO (1469–1527), Italian writer, was born at Florence. He entered the service of the republic in 1493, as secretary of the Ten. He went on a mission to Cæsar Borgia, the lord of Romagna (1502–3). The victory of the Medici party brought about his dismissal (1512). He was suspected of having taken part in the conspiracy of Boscoli and Caponi, and was imprisoned for a while (1513). In 1519 he gained the favour of the Medici, who conferred some minor posts on him, which he held while writing the *Istorie Fiorentine*. Three of Machiavelli's great

works may be said to supplement each other. The *Principe* (1532) deals with the founding of a new state, and suggests as model the duchy of Romagna, as founded and governed by Caesar Borgia. Machiavelli's own political ideal was a republic such as Rome had been, and in the *Discorsi sopra la Prima Deca di T. Livio* (1531) he uses Livy as a peg on which to hang and by which to illustrate his own favourite theories. The *Arte della Guerra* (1521) upholds the idea of an armed people, and of the infantry as the main strength of the army, thus again going back to Rome and her legions as a model. The *Istorie Fiorentine* (1531) treats of the history of Florence from early times down to the death of Lorenzo de' Medici (1492) in a way that is neither strikingly original nor scientifically accurate. Among the works of smaller compass the *Mandragola* (1513) stands first as a brilliant comedy of manners (even though the manners be anything but edifying). Others (published at Florence in 1545) include the *Asino d'oro* (after Apuleius), the novel of *Belfagor* (a satire on matrimony), the *Decennali* (a sketch in verse of contemporary events), and the *Capitoli* (elegiac poems, moral in tone). Machiavelli's Works were rendered by E. Farnsworth (1762), and the chief prose works by C. E. Detmold (1882). All the biographies were supplanted by Villari's masterly *Niccolò Machiavelli e i suoi Tempi* (1st ed. 1877; 2nd ed. 1895-96; Eng. trans. 1878; popular ed. of same, 1904). English students should consult Macaulay's essay (1827), Lord Acton's Introduction to Burd's ed. of the *Principe* (1891), and John Morley's Romanes Lecture (1897).

Machine Construction. Cast iron enters most largely into the construction of machines, being the cheapest and most effective material for heavy and bulky parts, such as bed-plates and frames, for cylinders, pump casings and valve-boxes, and, generally speaking, for all positions which require strength rather than toughness. Wrought iron and steel are essential for shafting, connecting and piston rods, and all parts subject to heavy tensile and transverse stresses. Brass or gun-metal is used for bearings and other surfaces exposed to heavy friction. Cast iron and brass receive their rough form by founding—i.e. by running the molten metal into moulds of the requisite shape. (See CAST). The wrought-iron members of machinery are forged, small pieces by the smith, large parts under a heavy steam-hammer. The latter are built up of successive layers of white-hot scrap iron,

and welded into one homogeneous whole by reheating and continuous hammering. Steel forgings are worked in a similar manner, being, however, formed from one solid ingot, instead of built up of a number of pieces. The hammering process is equally necessary in the case of steel, in order to ensure the complete elimination of blow-holes, which are usually present in the ingot. See Lineham's *Mechanical Engineering* (1894); Rose's *Complete Practical Machinist* (1895); and Cryer and Jordan's *Machine Construction* (6th ed. 1896).

Machine Guns. See GUNS.

Machines, AUTOMATIC. A large number of machines may be termed automatic in that, being set in motion, with an adequate supply of motive power they perform a series of operations without further intervention from the man in charge. Wood-working and metal-shaping machines, for instance, turn out in a practically finished state articles of often intricate shape—the man in charge having only to place the piece of wood or metal in position, adjust and oil the machine, apply and shut off the power. Various types of conveyors work automatically on a larger scale and through a wider series of operations. Coal-conveyors, for example, sort, clean, and distribute the coal by means of a series of travelling belts and endless chains of reversible buckets, without any intermediate adjustment by hand. Weighing appliances, however, afford the most perfect examples of automatic machines, as in them no external power is required, and no supervision needed after the first adjustment. Automatic weighing machines separate a constant supply of material into a succession of equal weights, at the same time registering the number of weighings, so that an absolute record is obtained of the amount of material passed through. They are designed to weigh out powders in ounces, coffee or peas in pounds, grain in cwt. or tons, and coal in still larger quantities, at a rate of from twenty to two lots a minute, according to the class of material. Their construction is simple, the action depending on the regular flow of the material to be weighed into a hopper, which discharges its contents through the bottom as soon as their weight balances that of a counterweight on a long-armed beam. On a smaller scale automatic machines afford a ready means of supplying small articles without the expense of an attendant. Somewhat the same balance principle is adopted, the introduction of a coin (which also serves as payment) releasing a

catch, and allowing the drawer or other receptacle for the article in question to be pulled out, or setting free for action some simple mechanism, as that of a light weighing machine, a lock, or the controlling spring of an electric light. In the American Senate votes are recorded by an automatic contrivance fixed into the desk of each senator, and a similar device has been suggested for registering the votes at elections. Another application of the balance principle is that of the automatic change machine, from which silver can be extracted equal only in value to the amount of gold inserted into the slots.

Machines, HYDRAULIC. See HYDRAULIC MACHINERY.

M'Ilwraith, SIR THOMAS (1835-1900), Australian statesman, was born at Ayr, Scotland. He emigrated to Victoria (1854) as a railway engineer. In 1874 he entered political life in Queensland. During his first premiership (1879-83) he annexed New Guinea to Queensland. After resigning a second premiership (1888) he joined Sir Samuel Griffith's ministry, and in 1893 was again premier. In 1895 he retired in ill-health to England.

Macintosh, CHARLES (1766-1843), Scottish chemist, born in Glasgow. While trying to utilize the coal-naphtha given off in distilling tar, he discovered a process of dissolving india-rubber and waterproofing cloth. He patented the invention in 1823.

Macintyre, MARGARET, operatic singer, was born in India. Her first important concert was in Edinburgh in 1888. She sang soprano in Liszt's oratorio of *Elizabeth*, was Michaela in *Carmen* (1888), and later Rebecca in *Ivanhoe*. In 1891 she took part in the Handel festival.

Mack, KARL, FREIHERR MACK VON LEIBERICH (1752-1828), born at Neunslingen in Franconia, entered the Austrian army (1770), and fought against the Turks, the French republic, and Napoleon I. While serving under the king of Naples he took Rome (1797), but failed to hold it, and at Naples gave himself up to the French. Having escaped from Paris (1800), in 1805 he was sent by the Emperor Francis to defend the Iller. He surrendered to Napoleon at Ulm with his whole army, and was imprisoned, but afterwards pardoned (1819).

Mackay, M. on Pioneer R., Queensland, 625 m. N.W. of Brisbane; one of the headquarters of sugar-growing. Pop. (1901) 4,091.

Mackay, ALEXANDER MURDOCH (1849-90), Scottish missionary, born at Rhynie, Aberdeenshire; laboured in Uganda (1878-90), where he established Christianity.

Mackay, CHARLES (1814-89), Scottish poet, born at Perth; edited the *Glasgow Argus* (1844-47) and *Illustrated London News* (1852), and was war correspondent of the *Times* during the American civil war (1862-5). But it was as a song writer that Mackay was most widely known: *Cheer, Boys, Cheer! The Good Time Coming, Tubal Cain, and England over All* were his work. See Mackay's *Forty Years' Recollections* (1877) and *Through the Long Day* (1887).

Mackay, HUGH (?1640-92), British general, born at Scourie in Sutherlandshire. He served Charles II., then fought for France against Holland, and followed William of Orange to England (1689). He was defeated by Claverhouse at Killiecrankie, but did good service in Ireland. He was killed in battle at Steinkerk in Flanders.

Mackay, JOHN WILLIAM (1831-1902), American capitalist, known as the 'Silver King,' born in Dublin; removed to New York (1851), proceeded to Nevada (1852), and by purchasing shares in the Bonanza mine became exceedingly wealthy.

Mackay, ROBERT (1714-78), Gaelic poet, commonly called Rob Donn, born at Allt-na-Caillich in Sutherlandshire. He was without education, being a herd. For some time (1759-67) he was in the Sutherland Highlanders. His poems are in the Sutherlandshire dialect, and only a few have been translated—e.g. *The Highlander's Return, The Song of Winter, A Poem on Death, and a Satire on Avarice*.

Mackaya, a one-species genus of plants belonging to the order Acanthaceæ. *M. bella* is a South African plant almost six feet in height, bearing racemes of pale lilac flowers, with very delicate purple markings. It is easy to grow under glass, but by no means easy to flower. During the summer it should be liberally supplied with water and air. From November to April, however, no water should be given. In spring the flowers should be gradually encouraged to open in a temperature of about 60°, lowering the temperature 10° as soon as the flowers open.

M'Keesport, city, Allegheny co., Pennsylvania, U.S.A., on Monongahela R., 12 m. S.E. of Pittsburgh. It is in the centre of the bituminous coal region, and has large steel and iron works. Pop. (1900) 34,227.

M'Kees Rocks, bor., Allegheny co., Pennsylvania, U.S.A., on the Ohio, opposite Allegheny city; has manufactures of glass, iron, and steel. Pop. (1900) 6,352.

M'Kendrick, JOHN GRAY (1841), Scottish physiologist, born

in Aberdeen. After holding hospital appointments at Chester, London, and Fort-William, he became assistant-lecturer to Professor Hughes Bennett, and then extra-mural lecturer on physiology in Edinburgh. In 1876 he obtained the chair of institutes of medicine at Glasgow University. His chief works are *Animal Physiology* (1875), *Lectures on the History of Physiology* (1879), *Life in Motion* (1892), *Life of Helmholtz* (1899), *Christianity and the Sick* (1901), and a *Text-book of Physiology* (1888).

Mackenzie. (1.) River, British N. America, rises as the Athabasca, near Mt. Brown in the Rocky Mts., on E. of British Columbia, and flows for 680 m. till it reaches Lake Athabasca, which it leaves as the Great Slave R. It then flows N.W., receiving on l. bk. the rivers Peace and Finlay, and falls into Great Slave Lake. Issuing from this on the W., it is known as Mackenzie R., is about 1,000 m. long, and flows N.W. into Mackenzie Bay. The mouth is closed with ice from October to June. (2.) District of N.W. Territories, Canada, created in 1895, and extending from Athabasca and British Columbia on the S. to Arctic Ocean on N., and from Keewatin on E. to Yukon on W. Area, 563,200 sq. m. It is studded with swamps and lakes. The climate is severe in winter; the summers are short and hot. There is abundance of timber, and coal, salt, and other minerals exist. Fur-bearing animals abound. Pop. (1901) 5,216.

Mackenzie, ALEXANDER (1822-92), premier of Canada, was born at Logierait, near Dunkeld, in Perthshire, and emigrated to Canada (1842). He became in 1867 a member of the first House of Commons of the Dominion, and on the defeat of Sir John Macdonald in 1873 he organized a Liberal ministry, which held office till 1878, though Mackenzie headed the Liberal party until 1880. He vigorously supported the union of Canada and England, and opposed the protective tariffs of the Conservative party.

Mackenzie, SIR ALEXANDER CAMPBELL (1847), Scottish musical composer and violinist, born at Edinburgh. In 1865 he became teacher and organist (St. George's) in his native city. To obtain leisure to compose he retired to Florence (1879); but became principal of the Royal Academy of Music (1887), and conductor of the Philharmonic Society (1892) at Crystal Palace (1894). His works comprise *Jason*, a dramatic cantata (1882); *Colomba*, Mérimée's story as a lyrical drama (1883); *The Rose of*

Sharon, an oratorio (1884); *Veni, Creator* (1891); *His Majesty*, comic opera (1897); *The Empire Flag*; *Scottish Rhapsodies*; and incidental music to *Ravenswood, Little Minister, and Coriolanus*, besides songs, part-songs, and anthems. He belongs to the romantic rather than to the classical school of music.

Mackenzie, SIR GEORGE (1636-91), of Rosehaugh, prosecutor of the Scottish Covenanters, was born in Dundee; and king's advocate from 1677 till 1686, and again from 1688 to 1689. He was a voluminous writer on jurisprudence, constitutional history, and ethical subjects, and was the founder of the Advocates' Library, Edinburgh. See *Life*, by Riddiman, prefixed to *Collected Works* (1716-22); also *Memoirs* (1722), by himself.

Mackenzie, HENRY (1745-1831), Scottish man of letters, born at Edinburgh. He was appointed attorney for the crown to the Exchequer Court in Scotland, and later comptroller of taxes (1804). He is, however, best known as a man of letters. *The Man of Feeling* appeared in 1771, being a delineation of the character of one who is afflicted with excessive sensibility. This was followed by *The Man of the World* (1773) and *Julia de Roubigné* (1777). He was also the author of the lives of Dr. Blacklock, the blind poet, and John Home, author of *Douglas*, and was a leading contributor to the *Mirror and Lounger*, of which he was editor. He was the first to call attention, by his essay in the *Mirror*, to the genius of Burns. His influence led Walter Scott and others to begin the study of German.

Mackenzie, SIR MORELL (1837-92), English physician and specialist in diseases of the throat, was born at Leytonstone, Essex. In 1863 he won the Jacksonian prize (Royal College of Surgeons) for an essay *On the Pathology and Treatment of Diseases of the Larynx*. He published a *Manual of Diseases of the Throat and Nose* (2 vols. 1880-4), which is a leading text-book. Mackenzie attended Frederick, Emperor of Germany, in his fatal illness (1887-8). A mistaken diagnosis of the disease in its early stage (afterwards found to be cancer in the throat), and a somewhat polemic attitude on Mackenzie's part, led to strained relations with the German doctors in attendance. Ill-feeling was increased by the publication by Mackenzie of *The Fatal Illness of Frederick the Noble* (1888).

Mackenzie, WILLIAM LYON (1795-1861), leader of Canadian rebels, was born at Dundee, and emigrated to Canada in 1820. As

a journalist, he took an extreme stand on the popular side in the struggle for reform. In 1828 he was elected to the legislature, but was expelled for libelling that body; his constituents, however, re-elected him each time he was expelled. The reformers sent him to appeal directly to the Imperial Parliament. After his return from London he became more violent, and in 1837 became leader of the rebels in the insurrection in Upper Canada. He established a provisional government, but eventually retired to the United States until 1849.

Mackerel (*Scomber scombrus*) belong to a family of bony fishes, the Scombridae. The other important species are the tunny and the bonito. The common mackerel ranges from the south of Norway to the Canary Is., and throughout the Mediterranean. In the British Isles it is abundant on the south and south-west coasts of Ireland, and in the English Channel; but it may be found along the whole of the east and west coasts. On the American side its range is from Cape Hatteras to the Strait of Belle Isle. It lives largely upon other fish, as young herrings, sprats, sand-eels, pilchards, and anchovies, but also on small crustaceans. It spawns in May, June, and July, approaching towards the coast from the open sea; the female sheds from about 300,000 to more than double that number of eggs, which are pelagic or buoyant. Hatching takes place about the sixth or seventh day. It is believed that mackerel attain sexual maturity at three years of age, when they measure twelve or thirteen inches; occasional specimens measuring eighteen or twenty inches are secured. The migrations of the mackerel are not well understood, and the movements of the shoals may be erratic, so that the fishery is liable to great fluctuations.

In Norway there are two fisheries, one from May to July, along the south and south-west coasts, chiefly by drift-nets and seines; the other in the North Sea, from July to October, by lines with hooks towed astern by the vessel under sail. Those caught by the last method are mostly cured for the American market. In Ireland the mackerel fisheries are the most valuable of all—viz.: (1) the spring fishing from March till June, drift-nets being used, and English, Scotch, Manx, and French boats taking part in it; (2) the autumn fishing from July to November, with drift-nets, seines, and whiffs, the mackerel being mostly cured and exported to America. The annual value ranges between £100,000 and £200,000. The Eng-

lish fishery is carried on chiefly on the south coast; the value in 1904 was £270,940. In America the mackerel fishery is much less productive than formerly. The annual value of the European mackerel fisheries may be placed at about £700,000; those of the world at over £1,500,000. See Aflalo's *Sea-Fishing Industry of England and Wales* (1904), and Johnstone's *British Fisheries* (1905).

Mackinlay, MRS. JOHN. See STERLING, ANTOINETTE.

M'Kinley, MOUNT, the highest peak in the N. American continent, in Alaska, 63° 5' N., 151° 45' W.; height, 20,464 ft. The peak is surrounded by glaciers.

M'Kinley, WILLIAM (1843-1901), twice president of the United States, was of Scoto-Irish descent, and was born at Niles, Ohio. He served as a volunteer during the civil war, and after the close of the war adopted law as his profession (1867). He was first elected to Congress in 1876, and served till 1891, when he was elected governor of Ohio. He was an enthusiastic protectionist, and as chairman of the Committee of Ways and Means gave his name to the tariff of 1890, the high-water mark of protectionism in the United States. In 1896 he was elected republican president. He was re-elected in 1900, but was shot at Buffalo by an anarchist named Czolgosz.

Mackintosh, SIR JAMES (1765-1832), Scottish philosopher, was born at Aldourie, near Inverness. A prominent figure in London literary and political society, his strong sympathy with the principles of the French revolution prompted him to reply to Burke in *Vindiciæ Gallicæ* (1791), though he afterwards repudiated the views therein set forth. In 1803 Mackintosh was appointed to the recordership of Bombay. From 1806 to 1811 he was judge in the Court of Admiralty. He wrote a *Dissertation on the Progress of Ethical Philosophy* (1830), and a *Life of Sir Thomas More* (1830). See *Life* by R. J. Mackintosh (2 vols. 1836).

Macklin, CHARLES (?1699-1797), British actor, was born in Ireland; first appeared in London in 1734, and continued to play there, for the most part at Drury Lane, until his retirement in 1753. Six years later he reappeared, and continued to act until 1789. He was an actor of considerable versatility, and won high praise for his portrayal of Shakespearean characters, particularly that of Shylock. His life, public and private, was a succession of quarrels and disputes, in great part arising from his ungovernable temper. He was the author of several plays, the best

known being *Love à la Mode* (1759) and *The Man of the World* (1781).

Macknight, JAMES (1721-1800), Scottish Scriptural critic and translator, was born at Irvine, Ayrshire; he entered the Church of Scotland, holding pastorates at Maybole, Jedburgh, and Edinburgh. He published a *Harmony of the Gospels* (1756), and a *Literal Translation of all the Apostolic Epistles, with a Commentary and Notes* (1795), the work of thirty years. See *Account* by Thomas Macknight (1806).

Mackonochie, ALEXANDER HERIOT (1825-87), English divine, was born at Fareham, Hampshire. While curate-in-charge of St. Alban's, Holborn, London, he underwent (1867-82) numerous prosecutions for ritualistic ceremonies and accessories. For a short time in 1883 he was vicar of St. Peter's, London Docks, but resigned owing to fresh difficulties. See *Memoir* by Mrs. Towle (1890).

MacLagan, WILLIAM DALRYMPLE (1826), archbishop of York, was born in Edinburgh. He was rector of St. Mary's, Newington, London; then vicar of St. Mary Abbott, Kensington, till 1878, when he was appointed bishop of Lichfield. In 1891 he was made archbishop of York. He has published *Pastoral Letters and Synodal Charges* (1892), and was joint-editor of *The Church and the Age* (1870).

MacLaren, IAN. See WATSON, JOHN.

Maclaurin, COLIN (1698-1746), Scottish mathematician and natural philosopher, was born at Kilmodan, Argyllshire. He was appointed (1717) to the mathematical chair at Marischal College, Aberdeen, from which, in 1725, he passed to Edinburgh University. For the insurance fund for widows of Scottish ministers and professors he voluntarily worked out the calculations. In his numerous mathematical essays and works he followed Sir Isaac Newton's methods. He also designed and superintended the building of the fortifications of Edinburgh in 1745. See *Life* prefixed to the *Account of Newton's Philosophical Discoveries*, by Maclaurin (1748).

M'Lean, ALLAN (1840), Australian statesman. He became premier of Victoria (1899-1900), commissioner of crown lands and survey (1890-1), president of Board of Land and Works (1890-1), minister of agriculture (1890), chief secretary (1891-3), and sat in the Turner administration (1894-8). In 1904 he became commonwealth minister of trade and customs.

Macleania, a genus of shrubs, natives of Mexico and S. America, belonging to the order Vaccini-

aceæ. They bear showy cylindrical flowers, either solitary or in fascicles or corymbs.

Maclehose, AGNES (1759-1841), the 'Clarinda' of Burns's poems, was born in Glasgow. After her separation from her husband a mutual attachment sprang up between her and Robert Burns. Their correspondence was published in 1843. See *Life* by W. C. Maclehose, prefixed to *Correspondence* (1843).

M'Lennan, JOHN FERGUSON (1827-81), Scottish sociologist, was born at Inverness. In 1857 he became a member of the Scottish bar, and achieved considerable success, latterly, as draftsman of parliamentary bills (Scotland). He is more widely known as the propounder of the matriarchal theory of primitive society, in *An Enquiry into the Origin of the Form of Capture in Marriage Ceremonies* (1855), reissued and enlarged (1876 and 1886) as *Studies in Ancient History*. He was also author of an attack on *The Patriarchal Theory* (1885), and *Memoir of Thomas Drummond* (1867).

Macleod, FIONA. See SHARP, WILLIAM.

Macleod, HENRY DUNNING (1821-1902), Scottish political economist, born at Edinburgh; devoted himself to economical questions, and became an authority on banking principles, bills of exchange procedure, and general commercial law. Author of *Theory and Practice of Banking* (1856), a standard work; *Principles of Economical Philosophy* (1873); *Elements of Economics* (1881-6); and *Binetallism* (2nd ed. 1894). See *Quarterly Review* (October 1901).

Macleod, NORMAN (1812-72), Scottish preacher and author, was born at Campbeltown, Argyllshire. He became in 1838 minister of the Church of Scotland at Loudon (Ayrshire), Dalkeith (1843), and the Barony Church, Glasgow (1851-72). In 1857 he was appointed chaplain to Queen Victoria. He edited *Good Words* from 1860, and devoted much effort to the furtherance of foreign missions. Besides sermons, he published sketches and stories of considerable merit. See *Memoir* by Donald Macleod (2 vols. 1876).

Macles, or TWIN CRYSTALS. Crystals tend to occur in groups of two or more, associated together according to definite laws. Those which have certain faces parallel in the different crystals, but others not, are known as macles, or twins. This is true especially of the zeolites; and in plagioclase feldspar, the crystals, though apparently simple, are built up of very many thin lamellæ, each of which is a twin

crystal. The physical explanation of the relationship is the existence of two positions of molecular stability. Sometimes the twin halves do not meet in a definite plane, but interpenetrate one another irregularly, as is frequent in quartz. When twinning is repeated twice a 'trin' is produced, consisting of three twin parts; other crystals consist of an indefinite number of twinned individuals, and are said to be polysynthetic.

MacLise, DANIEL (1806-70), Irish historical and genre painter, born at Cork. His first notable picture was a water-colour drawing, *Malvolio Affecting the Count* (1829); his *All-Hallow Eve* (1833), an Irish interior containing portraits of Sir Walter Scott and Crofton Croker, made a further impression; and in 1835 he was elected A.R.A. Full honours followed in 1840. During the years 1830-6 he executed, under the name of Alfred Croquis, his remarkable 'character portraits' for *Fraser's Magazine*; and his later work includes historical compositions, cartoons, easel pictures, water-colour drawings, and portraits. From 1851 to 1864 he was engaged on *The Interview between Wellington and Blücher, The Death of Nelson*, and other frescoes for the Houses of Parliament. His *Hamlet* and a second *Malvolio* are in the Tate Gallery, London, and his *Charles Dickens* in the National Portrait Gallery, London. See *Life* by O'Driscoll (1871).

Maclura, a genus of hardy deciduous trees belonging to the order Urticacæ. The only species is *M. aurantiaca*, the bow-wood or Osage orange, bearing yellowish-green flowers, followed by light yellow fruits about the size of oranges. It is a spiny plant, native to N. America, where it is often used as a hedging plant.

MacMahon, MARIE EDMÉ PATRICE MAURICE DE (1808-93), Duke of Magenta and marshal of France, was born at Sully-sur-Loire, near Autun, of Irish descent. After serving with distinction in Algeria, he was appointed governor-general (1864-70) of the province. Arriving in the Crimea (1855), he assaulted the Malakoff successfully (September 8). At Magenta he saved the day (1859), and was made duke and marshal on the field. In 1870 he failed to defend Alsace (beaten at Wörth), but, conducting a brilliant retreat, was placed in command of 120,000 men, with orders to join Bazaine. In doing so he was surrounded, and capitulated at Sedan. On his return from Wiesbaden (1871) he took Paris from the commune after desperate fighting, and

succeeded Thiers (1873) as president of the French republic, resigning in 1879. See *Le Maréchal de MacMahon*, by E. Daudet (1882).

MacMaster, JOHN BACH (1852), American historian, biographer, and engineer, born in Brooklyn, New York; was appointed instructor in civil engineering at Princeton (1877-83), and in 1883 professor of American history at the University of Pennsylvania, a chair he still holds. He has written *Bridge and Tunnel Centres and High Masonry Dams*; *A History of the People of the United States* (1883-1900); *Benjamin Franklin as a Man of Letters* (1887); *With the Fathers* (1896); *Origin, Meaning, and Application of the Monroe Doctrine* (1897); and *Daniel Webster* (1902).

Macmillan, English publishing house, was founded by Daniel (1813-57) and Alexander Macmillan (b. 1818); settled in London in 1839; established a business at Cambridge. The years 1858-72 mark the establishment of a London house; 1869 the opening of a branch in New York (now an important publishing centre); 1893 the conversion of the business into a limited liability company. In 1891 they printed a bibliographical catalogue of publications from 1843 to 1889 inclusive. In 1901 they started in Bombay a publishing centre for India, Burma, and Ceylon. *Macmillan's Magazine* was started in 1860. See Harper's *Memoir of Daniel Macmillan* (1882).

Macmillan, HUGH (1833-1903), Scottish minister and author, was born at Aberfeldy, Perthshire. He was the author of *First Forms of Vegetation* (1861), *Bible Teachings in Nature* (1867), *The Garden and the City* (1872), *Roman Mosaics* (1888), *My Comfort in Sorrow* (1890), *The Daisies of Nazareth* (1894), *Gleanings in Holy Fields* (1899), *The Highland Tay* (1901), and a monograph on G. F. Watts, R.A. (1904). He was minister of the Free West Church, Greenock, until 1901.

Macmonnies, FREDERICK (1863), American sculptor, born in Brooklyn; was apprenticed when seventeen to the sculptor St. Gaudens, and also studied under Falguière in Paris. In 1889 he exhibited his *Diana* at the Salon. During 1892-3 he worked on the huge fountain for the Chicago Fair. Among his statues, characterized by effective composition, refinement of modelling, and admirable equilibrium, are *Nathan Hale*, in City Hall Park, New York; *Sir Harry Vane*, in the new Boston Public Library; and the colossal figure of *Victory* on the battle column at West Point.

Macnaghten, SIR WILLIAM HAY (1793-1841), British diplomatist and Orientalist, born probably at Bushmills, Co. Antrim. His name is associated with the British intervention in the affairs of Afghanistan (1838), and the dispatch of an expeditionary force, which culminated in the occupation of Kabul. He was assassinated by the chief, Akbar Khan, whilst attending a conference at Kabul.

Macnamara, THOMAS JAMES (1861), educationist, was born at Montreal. From 1876 to 1890 he was a school board teacher at Exeter, Huddersfield, and Bristol, and became president of the National Union of Teachers (1896). Since 1892 he has edited the *Schoolmaster*, an authoritative organ on elementary education. He became associated with the London School Board as progressive member for West Lambeth in 1894, and remained connected with it until its dissolution by the Education Act of 1903. At the general election of 1900 he was returned for North Camberwell. He is a strenuous advocate of a sound and efficient system of national education. He is also keenly interested in all social and labour questions. He is, further, the author of the 'Cockerton' Act of 1902, and has published *School-room Humour* (1905).

Macneill, HECTOR (1746-1818), Scottish poet, born at Roslin, Midlothian. He worked in a mercantile warehouse in Guadeloupe, and in 1780 was appointed assistant secretary to two flagships. His first poem, *The Harp*, appeared in 1789, and *Scotland's Scath, or the History of Will and Jean*, in 1795, and *The Woes o' War* in the following year. His *Poetical Works* were issued in 1801 (reprinted 1856). He is best known as the author of the songs *Will and Jean*, *My Boy Tammy*, and *Come under my Plaidie*.

MacNeill, JOHN GORDON SWIFT (1849), Irish politician, was born at Dublin, and was professor of constitutional and criminal law at King's Inn, Dublin (1882-88). He has represented South Donegal since 1887 as a member of the Nationalist party. He is the author of *The Irish Parliament* (1885), *How the Union was carried* (1887), and *Titled Corruption* (1894).

Macon. (1.) *Anc. Matisco*, cap., dep. Saône-et-Loire, France, on Saône R., 40 m. N. of Lyons. Its old cathedral is now in ruins. Watches and agricultural implements are made. The town is celebrated for its wines, and was the birthplace of Lamartine. Pop. (1901) 18,928. (2.) City, Georgia, U.S.A., co. seat of Bibb

co., at the falls of the Ocmulgee, 80 m. S.E. of Atlanta. It has iron foundries, and manufactures cottons and machinery, and is the seat of Mercer University. Pop. (1900) 23,272.

Macpherson, JAMES (1736-96), 'translator' of Ossian, was born at Ruthven, Inverness-shire. In 1760 he published, with translations, a collection of old Gaelic poems, as *Fragments of Ancient Poetry*. This was followed, in 1762 and 1763 respectively, by his 'translations' of Ossian's *Fingal* and *Temora*. There can be little doubt that these 'Ossianic' poems were to a great extent Macpherson's own, but that he used in their composition a number of fragments of Gaelic legends. He acted as agent to the nabob of Arcot from 1780 until his death. He was buried in the Poets' Corner, Westminster Abbey.

Macquarie. (1.) Group of uninhabited isls., S. Pacific, 500 m. S.W. of New Zealand, to which it has been annexed. Area, 170 sq. m. (2.) River, N.S.W., Australia, formed by the junction of the Fish and Campbell Rivers; tributary of the Darling. Total course, about 350 m.

Macqueen, ROBERT, LORD BRAXFIELD. See BRAXFIELD.

Macready, WILLIAM CHARLES (1793-1873), English actor and manager, born in London; appeared (1810) at Birmingham as Romeo, and in 1811, at Newcastle, played Hamlet with Mrs. Siddons. Subsequently he acted at Covent Garden, Drury Lane, Dublin, Edinburgh, and Paris, dominating the stage (1819) as Richard III. His favourite parts were Macbeth and Werner; but he created, amongst others, Virginius, Strafford, Claude Melnotte, Richelieu, and Alfred Evelyn in *Money*. In the United States (1849), owing to Edwin Forrest's enmity, his theatre was mobbed. See his *Diary and Reminiscences* (1875), and *Life* by W. Archer (1890).

Macrinus (164-218 A.D.), emperor of Rome from 217 to 218 A.D., was born at Casarea, in Mauritania, and was prefect of the prætorian guards under Caracalla, whom he succeeded. He was severely defeated near Nisibis by the Parthians, and forced to purchase peace. His troops mutinied and defeated him near Antioch. He fled to Chalcedon, but was betrayed and executed.

Macrozamia, a genus of evergreen Australian plants belonging to the order Cycadaceæ. They bear mostly ovoid cones, with hard scales thickened at their apices. They are easily grown under glass, in well-drained peaty loam.

MacTaggart, WILLIAM, Scottish painter, a native of Campbelltown, one of the leaders of the Scottish impressionist school. He holds place in Scotland much in the same way as does Watts in England. Orchardson, James Pettie, and MacTaggart were fellow-students. His work has run principally in the interpretation of nature, more particularly when allied with the dominating actions of man. A brilliant colourist, he has a mode and style of his own. As a painter of fishfolk he is pre-eminent—e.g. his *Harbour Bar* and *Through Wind and Rain*. In portrait-studies of children he has also excelled—e.g. *The Belle*. Painter of *Summer Breezes* and *Dora* (National Gallery, Edinburgh).



Mactra.

1, *M. stultorum*; 2, *M. subtruncata*; 3, *M. solida* (chewing animal).

Mactra, a genus of bivalve molluscs, including a number of common British species. Fool's mactra (*M. stultorum*), in which the shell is prettily marked with radiating lines, is very common on sandy shores, and has a delicate and brittle shell. All the species live in sand, and are capable of using the foot in leaping. The shell is roughly triangular, the two valves being equal.

MacWhirter, JOHN (1839), Scottish painter, born at Slateford, near Edinburgh. He was elected A.R.A. (1879) and R.A. (1894). A brilliant member of the Scottish school of painting, he excels in depicting the rugged beauty and lonely grandeur of the Highlands and moors of Scotland, and notably mountain birches. His diploma work was *Nature's Archway*. His *June in the Austrian Tyrol* was purchased out of the funds of the Chantry Bequest, and is in the Tate Gallery, London. Among other examples of his brush are *The Lord of the Glen*, *The Track of the Hurricane*, *The Silver Strand*, *Loch Katrine*. He is the author of *Landscape Painting in Water Colour* (1900).

Madagascar, isl. in the Indian Ocean, separated from E. coast of Africa by Mozambique Channel, 250 m. wide. Its extreme

length, from Cape Amber in the N. to Cape Sainte Marie in the S., is 980 m. and its average breadth 270 m. The main orographical features are two plateaus, one occupying the northern extremity as far S. as Mandritsara in 16° S. lat.; the other, of far greater area, extending over Imerina, Betsileo, and Bara, nearly to 24° S. lat. These plateaus are sepa-

ft. above sea-level. Extinct volcanoes are scattered over the island, the chief being Ankaratra, the culminating point of Madagascar (8,790 ft.). Diégo Suarez, formed by the peninsula of Cap d'Ambre, is one of the best harbours in the world. Tamatave also is a good harbour, and Antongil Bay affords safe anchorage. The N.W. coast is much

28 in. Towards the S. the temperature is lower, while the rainfall is from 40 to 60 in. The high plateaus enjoy a more temperate climate. At Tananarivo the mean is 55°, and the average rainfall 54 in. Thunderstorms and hurricanes occur frequently. The forests yield valuable timber—rosewood, mahogany, palisander (*jacaranda*), and ebony—fibres (as raffia and *Musa textilis*), copal and other gums, and india-rubber. Edible fruits, as ground-nut, coco, bread-fruit, banana, mango, tamarind, and lemon, are common; and cotton, hemp, vanilla, sugar-cane, coffee, and cocoa are grown. The traveller's tree is a striking form; ferns are particularly abundant. The fauna is marked by the presence of lemurs and the curious aye-aye. The most widely distributed minerals are iron and gold. The most prominent people are the Antaimera or Merina, known to Europeans as Hovas. They live on the plateau of Imerina, and their dominion before the French occupation extended over two-thirds of the island. On the N.W. coast there has been an infusion of Arab blood. Textiles are woven from the fibre of the *Raphia* palm, and silk is produced. Rum is manufactured, and oil from several fruits. Goods are carried by porters, most of the routes being merely footpaths. The French have, however, constructed a few good carriage roads, and have opened a railway (64 m.) from Brickaville on the E. coast to Fanovana, which will be continued to Tananarivo. The exports, consisting chiefly of live animals, animal products, oils, fibres, grains, and various textiles, amounted in 1904 to the value of £774,298, and the imports to £1,056,775.

Madagascar was annexed by the French in 1895. In 1868 Protestant Christianity was proclaimed the state religion of the Hovas, but the people still retain many superstitious observances. In 1902 there were 450,000 Protestants and 50,000 Catholics in a total population in 1901 of 2,505,237. Of these the Hovas and Sakalavas numbered 850,000; the Betsileos, 600,000; the Ibaras and other southern tribes, 400,000; the Betsimisarakas and other east coast tribes, 400,000; the Sihanakas and other northern tribes, 300,000. The capital is Tananarivo. Area, 227,750 sq. m.

See Sibree's *Madagascar and its People* (1870), *The Great African Island* (1880), and *Madagascar before the Conquest* (1896); Cousins's *Madagascar of To-day* (1895); Catat's *Voyage à Madagascar* (1896); Grandidier's *Histoire physique, naturelle et politique de Madagascar* (1876, etc.).



rated by a saddle less than 2,000 ft. high, which has played an important part in the history of the island. The greater plateau slopes from E. to W., frequently rising to 5,200 ft. on the E., but seldom exceeding 3,900 ft. on the W. Towards the E. coast the descent is very rapid, while on the W. lies a country of plains and flat-topped hills 1,300 to 1,600

indented, and has harbours at Nossi-Bé, Port Radama, and the bays of Bombétoko (Majunga) and Betsiboka. The climate is tropical, and there is a dry season from May or June to December, and a wet season. At Diégo Suarez the annual mean temperature is about 80°, the highest in the island, and the range is from 73° to 88°. The rainfall is about

Madava Rao, SIR RAJA T. (1828-91), Indian administrator, born at Combaconum, Madras. Although a faithful Brahman, he displayed outside his caste the most liberal views, and encouraged and promoted social and political reforms. He was prime minister of Travancore in 1857. During the minority of the Gaekwar of Baroda he acted for ten years as administrator of the state.

Maddaloni (anc. *Sessuela*), city, Caserta, Italy, 14 m. N.E. of Naples. It possesses a royal college and a military school. Weaving and quarrying are the chief industries. Pop. (1901) 21,270.

Madden, SIR FREDERIC (1801-73), English palaeographer and antiquary, was born at Portsmouth. He has edited an edition of *Havelok the Dane* (1828), Layamon's *Brut* (1847), and Wycliffe's *Bible* (1850), the last named with Rev. Josiah Forshall. In 1837 Madden became head of the manuscript department of the British Museum. His journals, etc., in the Bodleian Library are to remain unopened till 1920. See *Memoir* by Connop Thirlwall (1873).

Madder, the root of *Rubia tinctoria* and other plants of the same family, was formerly largely grown in W. Europe, Turkey, and Japan. There are several varieties, which are prepared for the market by keeping and grinding. Madder was at one time very valuable on account of the colouring matters, alizarin and purpurin, that are present in the root as glucosides, but it is now very largely superseded by synthetically prepared alizarin. Garancin, a preparation obtained by treating the root with dilute sulphuric acid, and various extracts of madder, were also commercial forms of the dye-stuff.

Madeira, a wine which closely resembles sherry, having a fine, soft, mellow flavour, combined with elegance and an exceptionally beautiful bouquet. It is a fortified wine, containing from 15 to 21 per cent. of alcohol. Many of the best brands are sent on long sea-voyages to modify and improve them. This wine takes its name from the island of Madeira, where much of it is produced. Among the important brands are Boal or Bual and Verdelho, rich, mellow, and choice; and San Antonio and Sercial, fine, dry, and pale.

Madeira. (1.) Group of Portuguese islands in the Atlantic, 390 m. W. of Morocco, comprising Madeira, Porto Santo, Desertas, Bujo, and Selvagens, the three first only being inhabited. Area, 315 sq. m.; pop. (1900) 150,528, mostly on Madeira. Madeira itself is an oval island, measur-

ing 35 m. by 15 m. The coasts are steep and rocky; the highest point, Pico Ruivo, reaches 6,060 ft. The mountain slopes are terraced for cultivation, and fruits of all kinds are grown with the help of irrigation. Its equable and salubrious climate has made Madeira a favourite health resort for Europeans. Wines, fruits, vegetables, honey, sugar, wax, cane and wicker goods, lace, and straw hats are exported. The imports in 1904 amounted to £431,556, and the exports to £171,793. Funchal, on the S. coast, is the capital. Colonized by the Portuguese in the 15th century, Madeira was occupied by the British in 1801 and 1807-14. (2.) See AMAZONS, PERU.

Madhava Acharya, Hindu Sanskrit scholar and writer of the 14th century. To him is attributed the *Parāśara-Mādhavīyam*, a classification of Hindu religious law, subsequently supplemented by his *Vyavahāra*, which dealt with systems of law as generally understood. He is also responsible for important digests relative to ancient Indian philosophy, especially an introduction to the Mimamsa system, and a commentary on the same.

Madhu Sudan Datta (1824-73), Indian poet and man of letters, was born at Sagandari, Bengal; early embraced Christianity. He issued in Bengali the classical dramas, *Padmavati*, *Sarmishtha*, and *Kumari* (1858-61), followed by the epic *Meghanad-Badha*, instinct with lofty ideas.

Madison. (1.) City, Wisconsin, U.S.A., cap. of the state, and co. seat of Dane co., between lakes Mendota and Monona, 75 m. W. of Milwaukee. It manufactures agricultural implements, machinery, tools, flour, boots and shoes, carriages, and electric appliances. Madison is the seat of the university of Wisconsin. Pop. (1900) 19,164. (2.) River, Montana, U.S.A., has its source in the S.W. part of the state, and flows nearly N. to its junction with the Gallatin and Jefferson to form the Missouri. Its drainage area is 2,285 sq. m.

Madison, JAMES (1751-1836), president (fourth) of the United States, was born at Port Conway, Virginia. His great work was done during and after the war of independence in working out the union of state and federal law. He also advocated religious freedom and the acceptance of the impost law by the states, suggesting the famous compromise known as 'the three-fifths rule,' by which (in taxation) five slaves were rated as three freemen. His was the 'Virginia Plan' of federation (1787), and he was joint-author of *The Federalist*, a political science treatise (re-

published 1888). In 1801 he was secretary of state under Jefferson, and was president for a double term (1809-17). See *Madison Papers* (1841) and *Letters* (1865); also *Life* by Gay (1884).

Madness. See INSANITY and LUNACY.

Madonna, the term usually applied to representations of the Virgin Mary in art. The earliest existing picture of her is said to be one in the Capella Greca in the catacombs of Priscilla, Rome, assigned to the first half of the 2nd century. Other early examples show traces of classic form, and in Rome that tendency persisted even after Byzantine influence asserted itself throughout Italy. The famous Rucellai Madonna in Santa Maria Novella, Florence, which is attributed to Cimabue by tradition, but is now assigned by some critics to Duccio, the great statue of the Virgin and Child, and the exquisite ivory statuette by Giovanni Pisani, still in Pisa, and the Majestas by Duccio, which was carried in triumph procession through the streets of Siena in 1311, show a freer and more natural manner. With the great artists of the 14th, 15th, and 16th centuries the Madonna was a favourite subject. Favourite incidents are the Annunciation, the Holy Family, the Adoration, the Assumption, and the Coronation. Other celebrated Madonnas are by Mantegna, Botticelli, and Bellini, two or three reliefs by Donatello, and Michael Angelo's statue in the Medici chapel, Florence; Leonardo's *Virgin of the Rocks*; and three famous Raphaels—the *Madonna degli Ansidesi*, the *Madonna della Sedia*, and the *Madonna di San Sisto*. See Jameson's *Legends of the Madonna* (2nd ed. 1857), Venturi's *La Madonna* (1900), and Baumbach's *Die Madonnendarstellung in der Malerei* (2nd ed. 1896).

Madras. (1.) Presidency of India, at the S. extremity of the peninsula. Its N. limits reach the Bombay Presidency on the one side, and the Bengal Presidency on the other, with the dominions of the Nizam and the Central Provinces between. Its area is 141,190 sq. m. British territory, besides 9,610 sq. m. under native rule. The E. and W. Ghats run parallel with the respective coasts, and are linked at the S. by the Nilgiri Hills. The rivers Godavari, Kistna (Krishna), and Cauvery rise in the W. Ghats, and discharge into the Bay of Bengal. The only important lake, Pulicat, 33 m. long, lies N. of the capital. Gold is mined in Mysore and in the Nilgiris; copper and lead in the E. Ghats; garnets and diamonds are also found; iron, coal, and silver exist,



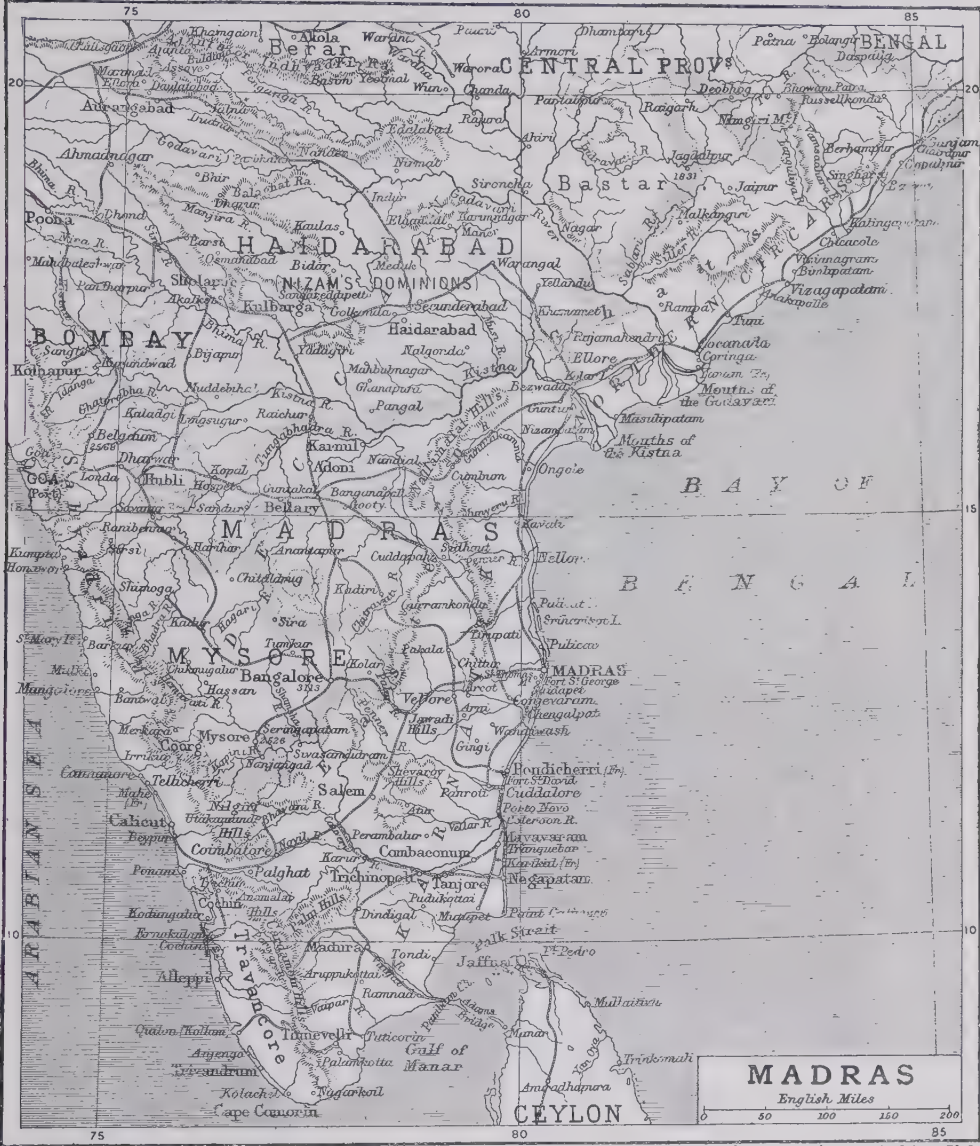
Views in Madras.

1. Parthasarathy Temple. 2. View from the Pier. 3. Chennappa Palace. 4. Madras Cathedral. 5. Government House. (Photos by Frith.)

but are not exploited. Forests cover 15,862 sq. m. Famines have been rather frequent, the worst being those of 1833, 1865-6, 1876-78, and 1892. Although the presidency has no natural harbours,

dency amounts to over twenty millions sterling. The chief articles of export are hides, coffee, raw cotton, rice, oils, spices, indigo, coir, sugar, tobacco, and tea. The native state of Mysore is

proportion of Christians (mostly Roman Catholics) is larger than in any other part of India. The Laccadive and Maldive Islands, off the Malabar coast, are, for administrative purposes,



Madras on the E. coast is one of the most important in the Indian empire, and Kanara, Malabar, and Travancore on the w. are centres of considerable export and import. The value of the sea-borne trade of the presi-

directly administered by the imperial government of Calcutta. Travancore is ruled by a maharajah on European lines. The bulk of the population are Hindus, and a considerable percentage Mohammedans, but the

included in the Madras Presidency. Pop. (1901) 38,623,066. (2.) Capital of above presidency, on the Coromandel coast, in lat. 13° 4' N., and long. 80° 15' E. Notwithstanding that it has no natural harbour, it ranks among

the foremost seaports of British India. On the foreshore is 'Black Town,' the commercial quarter; to the s. is the citadel, Fort St. George, Government House, and the public offices; the densely-populated native quarters straggle to the w. and s.; then come the houses of the Eurasian population; and beyond, the residences of Europeans. The total trade in 1903 was valued at over £7,000,000.

In 1504 the Portuguese founded here the town of St. Thomé. In 1639 the rajah of Chandragiri granted to the East India Company a site close to St. Thomé.

at the *Bedside of Ferdinand III.* (1843), *The Three Holy Women at the Sepulchre* (1845), and the portrait *King Don Francisco*.

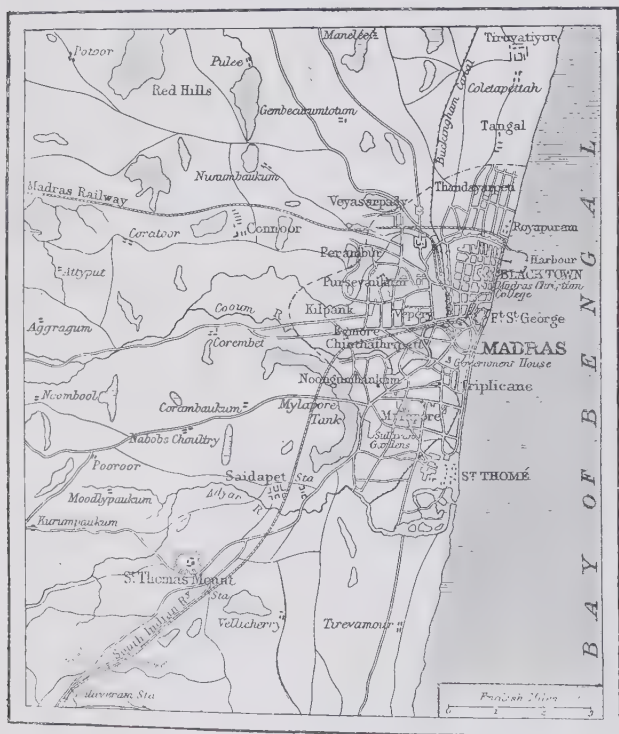
Madrepore. See CORAL.
Madrid. (1.) Province, Spain, occupying the southern and eastern slopes of the Guadarrama Mts., and reaching down to the Tagus near Toledo. The climate is arid and parched in summer and bleak in winter. The productions, apart from the capital, are mainly agricultural and horticultural. Much granite and free-stone are quarried. Area, 3,084 sq. m. Pop. (1900) 775,034, including the capital. (2.) Capi-

rapidly. Its streets are wide and handsome, especially that of Alcalá, one of the finest streets in Europe. The central square is the renowned Puerta del Sol, into which ten streets debouch. In addition to the university there are a normal school, veterinary school, schools of commerce, engineering, architecture, music, and the fine arts. The National Library contains 600,000 volumes and 30,000 manuscripts; while the National Museum of Painting and Sculpture has a fine collection of the works of Raphael, Titian, and Rubens, in addition to the most famous productions of Velasquez. The city experiences scorching southerly winds and fierce heat in summer, and icy blasts from the snowclad Sierra Guadarrama in winter. Industrially it is not very active, tobacco being the chief manufacture. Pop. (1900) 539,835.

Madrigal, a term often used in a loose sense for any light song, but properly denoting a type of song of Italian origin which normally consists of two or three tercets, followed by one or more couplets. It is also used for the music written for such songs. Madrigals were either sung by three or more unaccompanied voices, or played upon viols. They were written by most of the 16th and 17th century composers. Ultimately the form was merged in the glee. See Oliphant's *Short Account of Madrigals* (1836), *Musa Madrigalesca* (1837), and F. E. Schelling's *A Book of Elizabethan Lyrics* (1895).

Madura. (1.) Capital of dist., Madras Presidency, India, 270 m. s.w. by rail of Madras. For centuries it was the religious and political capital of S. India, and it contains some of the finest extant examples of Hindu architecture, including the granite temple of Minarchi, or the Fish Mother. Rebuilt in the 2nd or 3rd century, it was nearly destroyed during the Mohammedan conquest of the 14th century. Its present splendour is due to Tirumulla Nayak (1623-59). The town has coffee and cotton mills and cigar factories. Brass-ware and dyed cotton-cloth are also made. Madura is the centre of American mission effort in South India. Pop. (1901) 105,984. (2.) Mountainous isl., Dutch East Indies, separated from Java on the w. by the Surabaya Strait, and on the s. by the Madura Strait. Fishing and cattle-rearing employ most of the inhabitants. Area, 1,770 sq. m. Pop. (1897) 1,652,580.

Madvig, JOHAN NICOLAI (1804-86), Danish scholar and statesman, born at Svaneke in Bornholm; became (1829) professor



Madras City.

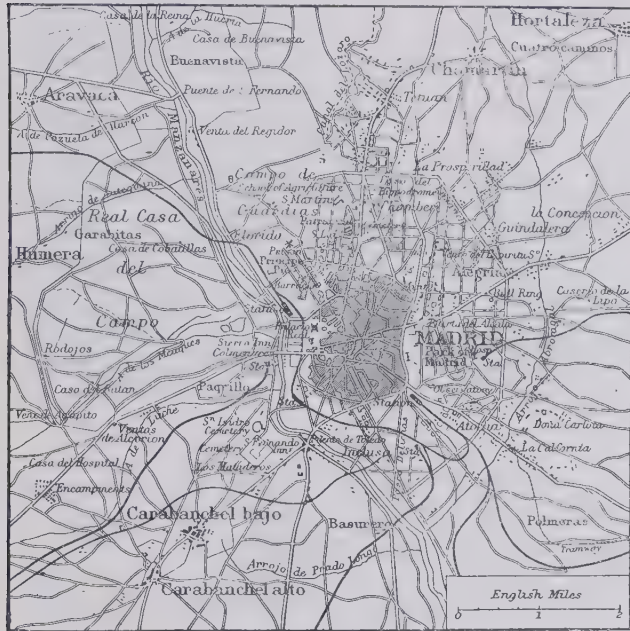
Attacked in 1702 by Aurungzebe's army, in 1741 by the Marathas, Madras fell to the French in 1746. In 1748 it was restored to the British by the treaty of Aix-la-Chapelle. Pop. (1901) 509,346; 256,730 males, 252,616 females.

Madrazo y Kunt, FEDERICO DE (1815-94), Spanish painter of historical and portrait subjects, was born at Rome; succeeded his father as director of the Prado Gallery in Madrid, and was professor at the Madrid Academy. Among his works are *Godefroy de Bouillon proclaimed King of Jerusalem* (1839), *Maria Christina*

tal of above prov. and of Spain; stands on a bleak, treeless tableland between the Guadarrama Mts. and the Tagus, at an elevation of 2,140 ft. The history of the city begins with the Moors, by whom it was called Magerit. It was captured by Ramiro II. of Leon in 933, but was again lost. Ferdinand I., it is asserted, again took it temporarily in 1047. It became permanently a Christian city under Alfonso VI. of Castile (1083). When Philip II. made it the capital of the realm (1560), the city contained a population of 25,000, and then increased

of Latin language and literature at Copenhagen University, resigning in 1880. He compiled a *Latin Grammar* (1841) and *Greek Syntax* (1846), long famous, and issued noteworthy editions of

of Moskenäs and Mosken, in the Lofoden group. It is only when the north-westerly gales blow against the tide that this current is dangerous. See E. A. Poe's imaginative description.



Madrid.

Cicero's works, and *Emendationes Livianæ* (1860). About 1848 he entered parliament, and became minister of religion and education (1848-51). Author of *Opuscula Academica* (1834-42) and *Livserindringer* (1887).

Mæander, riv., Asia Minor. It rises in Phrygia, flows between Lydia and Caria, and falls into the Ægean Sea. Its windings have made its name proverbial. The modern name is Menderes. Its length is 240 m., and it frequently overflows its banks.

Mæcenas, GAIUS CILNIUS (between 73 and 63 to 8 B.C.), friend and adviser of the Roman emperor Augustus, was of an Etruscan family of Arretium. In 42 B.C. his services were used in negotiating with Antony. During 36-34 B.C. he was entrusted with the maintenance of order in Rome and Italy; and also in 31 B.C., when he quashed the conspiracy of the younger Lepidus. He is, however, more famous as a literary patron. Virgil, Horace, and Propertius were among his friends, and received many benefits at his hands.

Maelström, an ocean current between the Norwegian islands

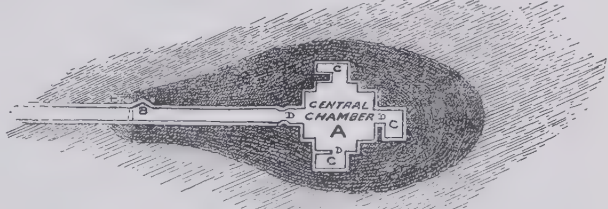
Mænades. See **BACCHÆ**.

Maerlant, JAKOB VAN (d.c.1291), Flemish poet, born near Bruges; translated Benoît de Ste.-More's *Roman de Troie*, but subsequently established a great reputation through his own lyrical compositions. Author of *Spiegel Historiaal* ('The Mirror of History') and *Rijmbijbel* ('Rhyming Bible'), the latter causing grave displeasure to the bishop of Utrecht.

280 ft. in circumference. Its artificial nature was not known to modern people until 1861. It consists of a room 15 ft. square, with three small lateral chambers. Runic inscriptions on the walls prove that the mound was broken into by Norsemen in the 12th century. Who were its actual builders is unknown. On the brow of Kewling Hill (parish of Firth), a few miles from Maes-How, is a similar but considerably smaller structure, examined by Mr. M. Charleson, Stromness, in 1901.

Maestricht. See **MAASTRICHT**. **Maestricht Beds** belong to the uppermost subdivision of the Cretaceous system in Belgium, and have probably no representative in the British Isles, except the Chalk of Trimmingham in Norfolk. It is a soft, almost tuffaceous limestone, and is full of fossils, especially of Bryozoa.

Maeterlinck, MAURICE (1862), Belgian dramatist and essayist, was born at Ghent. His thought has been greatly influenced by Novalis and Emerson. His first volume, consisting of verse, with the title *Serres Chaudes*, appeared in 1889, and was followed by *Douze Chansons* (1897). He has also written dramas—*La Princesse Maleine* (1889), *Les Aveugles* and *L'Intruse* (1890), *Les Sept Princesses* (1891), *Pelléas et Mélisande* (1892), *Alladine et Palamides*, *Intérieur*, and *La Mort de Tintagiles* (1894), *Aglavaine et Sélysette* (1896), *Sœur Béatrice* and *Ardiane et Barbe Bleue* (1901), *Monna Vanna* (1902), and *Joyzelle* (1903). His other works include a translation from the Flemish of Van Ruysbroeck, entitled *L'Ornement des Noces Spirituelles* (1891); a translation from Novalis (1895); two volumes of philosophical essays, *Le Trésor des Humbles* (1896) and *La Sagesse et la Destinée* (1898); *La Vie des Abeilles* (1901); and *Le Temple Enseveli*. A number of these works have been excellently translated into English by Sutro. Mae-



Plan of Maes-How, Orkney Islands.
A, Central chamber; B, recess; C, cells; D, doors.

Maes-How, an earth-covered building of stone, about a mile N.E. of the standing stones of Stennis, in the main island of the Orkneys, Scotland. Outwardly it is a grassy mound 36 ft. high, and

terlinck's dramas are not dramas of action but of thought, but he makes a very real drama of the mind, painting human nature in vivid colours. His plays are pervaded by melancholy, his



Views in Madrid.

1. Puerta del Sol. 2. Royal Palace. 3. Monument to Columbus. 4. The Bull Ring. 5. The Toledo Bridge.

characters suggesting a vain struggle in the inexorable web of fate.



Maurice Maeterlinck.
(Photo by C. Gerschel, Paris.)

Mæviad. See **RAVIAD**.
Mafeking, tn., Bechuanaland, British S. Africa, 200 m. N. of Kimberley, on the Cape Town-Bulawayo Ry. It was ineffectually besieged by the Boers from Oct. 11, 1899, to May 18, 1900. Pop. of dist. (1904) 21,436.

Maffei, FRANCESCO SCIPIONE, COUNT (1675-1755), Italian writer, was born at Verona. His tragedy, *Merope* (1714; Eng. version by Ayres, 1740), is generally regarded as having brought about the revival of tragedy in Italy. As a scholar, Maffei shines most in the *Istoria Diplomatica* (1727), *Verona Illustrata* (1732), and *Osservazioni Letterarie* (1732-40). His *Opere* were published in 21 vols. at Venice (1790).

Mafia, a secret society in Sicily. Its members are bound to avenge and protect one another if punished for brigandage or crime by the authorities. The government, though putting down its more violent manifestations, has failed to crush the secret organization of the society, which still keeps Sicily in a state of unrest and insecurity. See Cutrera's *La Mafia* (1903).

Mafra, tn., Estremadura prov., Portugal, 18 m. N.W. of Lisbon; famous for its monastery and royal palace, built in 1717 by John V. in imitation of the Escorial, and now used by the military authorities. Pop. (1900) 4,794.

Magadha, ancient kingdom of India, corresponding to the modern Behar and Oudh. Its capital, Pataliputra, was on the Ganges, possibly where Patna now is. One of its kings, Bimbisara, was the friend of Buddha in his early days.

Magadoxo. See **MOGDISHU**.
Magalhães, FERNAO DE. See **MAGELLAN**.

Magallanes, territory, Chile, lying S. of lat. 47° S. Area, 75,292 sq. m. Much of it is mountainous and forest-clad. The chief settlement is Punta Arenas, on the Strait of Magellan. Wool is the only export.

Magazine of Art, THE, was founded in 1878 by Messrs. Cassell and Co., with Mr. A. J. R. Trendell as its first editor. Among its early contributors were Sir Wyke Bayliss, Henry Blackburn, A. H. Church, and Percy Fitzgerald; while original drawings for its pages were made by Sir John Millais, Randolph Caldecott, and Percy Macquoid. In 1881 the editorship passed to Mr. W. E. Henley, who brought with him a brilliant train of contributors, including Robert Louis Stevenson, Richard Jefferies, Sidney Colvin, Andrew Lang, and Austin Dobson. Mr. Henley resigned in 1886, and was succeeded by Mr. W. H. Spielmann, who acted as editor until publication stopped in July 1904, and who from 1902 was its proprietor. In 1888 the magazine published the first of the special supplements of 'Royal Academy Pictures' (now continued as a separate publication); and in 1893 and 1894, a winter supplement, 'European Pictures of the Year.'

Magazines. Although a number of short-lived literary periodicals were produced in the latter part of the 17th century, the modern magazine may be said to have had its beginnings in 1731, when Cave brought out the *Gentleman's Magazine*. It was followed in 1739 by the *Scots Magazine* (afterwards the *Edinburgh Magazine*) and by several other publications of sectional interest, like the *Wesleyan Methodist Magazine*; but the future importance of this form of publication only began to be recognized when *Blackwood's* (Edinburgh) *Magazine* appeared in 1817. This became at once one of the great literary and political influences of its day. *Fraser's Magazine* (established in 1830, and changed in 1882 to *Longman's Magazine*; discontinued in 1905) was famous for containing many contributions from Thackeray and Carlyle; but a greater landmark in the history of magazine literature is to be found in the establishment of *Tait's Edinburgh Magazine* (1832), when the price was first reduced from two shillings and sixpence to one shilling. In *Bentley's Miscellany* (1837)—afterwards incorporated with *Temple Bar* (1860)—is to be found the first example of a magazine devoted purely to light literature; and it was followed by a great development of cheap

weeklies and miscellanies, of which the most famous are *Chambers's Journal*, *Household Words* (edited by Dickens), *All the Year Round*, and *Once a Week*, of which only the first named survives. In 1860 the *Cornhill Magazine* was produced under Thackeray's editorship, and for many years occupied a unique place in periodical literature—a place that was only challenged on the appearance of the illustrated magazines in the early 'eighties. In this direction the Americans had taken the lead, *Harper's*, *Scribner's*, *St. Nicholas*, *M'Clure's*, *Munsey*, and *Century* carrying the art of illustration by process work to a point unattempted in Britain, except in such special publications as the *Art Journal* (1849) and the *Magazine of Art* (1878). In 1883 the *English Illustrated Magazine* was begun, to emulate American enterprise; and soon afterwards the *Pall Mall Magazine* reached a high level of artistic excellence. In 1891 the *Strand Magazine* was published at sixpence, offering light and attractive fiction, profusely illustrated; and it attained a vogue which produced a crowd of imitators, such as *Harmsworth's*, *Pearson's*, the *Royal*, the *Windsor*. *Three-pence* (*Lady's Realm*) is the lowest price at which the popular magazines of the day are sold. Between 1884 and 1902 the monthly publications issued in London increased from 699 to 1,010.

Magazines, FIELD, small chambers in field-works for the safe storage of powder and ammunition. They are usually placed either in the interior of thick parapets or of traverses, or else built up against their inner (revetted) slopes. All magazines should be carefully drained.

Magdala, tn. and hill fort near the centre of Abyssinia, S. of Lake Dembea, 150 m. S.E. of Gondar, on a huge, steep, isolated mass of basalt 3,300 ft. above the Beshilo. It was stormed (April 13, 1868) by the British under Sir Robert Napier.

Magdalena. (1.) Department, Colombia. A branch of the E. Cordillera runs along the E. side, separating the basin of Lake Maracaibo from that of the Magdalena R. It is a promising agricultural country, and contains coal fields near the Atlantic. Santa Marta is the capital. Area, 24,440 sq. m. Pop. 100,000. (2.) River, Colombia, traversing the republic almost from its S. boundary to the Caribbean Sea. It has a length of 1,060 m., and drains a basin of 95,880 sq. m. At Neiva, 750 m. from its mouth, it becomes navigable by steamers. But at Honda navigation is interrupted by the great rapid, El Salto; consequently a railway, 21 m. long,

has been constructed to connect the upper and lower Magdalena. Of the tributaries the most important are the Saldana, Sagamoso, Lebrija, and Cauca.

Magdalene, MARY. See MARY MAGDALENE.

Magdeburg, tn., Prussian prov. of Saxony, 88 m. by rail w.s.w. of Berlin. It is intersected by the Elbe, is strongly fortified, and is a commercial centre. Its industries comprise shipbuilding and the construction of engines, machinery, armour-plate, and ordnance. The principal articles of commerce are sugar, chicory, and tobacco. Wood is imported in large quantities from Russia and Poland. The cathedral, a Gothic structure, containing the tombs of the Emperor Otto I. (d. 973) and the Empress Editha, was built in the 13th century. A new municipal museum for industries and art was opened in 1904. In 937 a Benedictine monastery was founded here; thirty-one years later it was raised to an archbishopric. During the Thirty Years' war, in 1631, the town was taken by the imperialists under Tilly, who cruelly ravaged it with fire and sword. In 1648 the archbishopric was converted into a duchy and given to Brandenburg. In 1806 Magdeburg capitulated to the French under Marshal Ney. Sudenburg, Neustadt, and Buckau, formerly independent towns, are now united in the municipality of Magdeburg. Pop. (1900) 229,667.

Magee, WILLIAM CONNOR (1821-91), archbishop of York, was born at Cork in Ireland. In his day, as an orator, debater, and conversationalist, he had few equals. He was successively dean of Cork (1864), bishop of Peterborough (1868), archbishop of York (1891). He was respected as a clear-headed exponent of masculine Christianity and a defender of the privileges of the Irish Church, but held heterodox views on the condemnatory clauses of the Athanasian creed.

Magellan, STRAIT OF, between Tierra del Fuego and the mainland of Chile. Its length is 360 m., while its breadth varies from 2½ m. to 17 m. It was discovered in 1520 by Magellan, and explored by the *Beagle* in 1826-36. The only important harbour is Punta Arenas.

Magellan, FERDINAND—in Portuguese FERNÃO DE MAGALHÃES —(?1470-1521), Portuguese navigator and explorer, was born probably at Villa de Sabrosa in Trás-os-Montes. He distinguished himself in the Indies and Malacca, as also in Africa (1510-12); but losing the king's favour on his return, he offered his services to Charles V. (1517). Aided by him, Magellan (1519)

crossed the Atlantic to Brazil (Rio), quelled a dangerous mutiny at San Julian, and discovered the strait called by his name. He then traversed and named the Pacific, and reaching the Philippines, fell in fight with the natives of Matan. See *First Voyage round the World by Magellan* (Hakluyt Society, 1874); Guillemaud's *Magellan and the Pacific* (1891).

Magellanic Clouds, two round patches of milky light near the S. pole of the heavens, described in 1516 by Andrea Corsali, the navigator, and named after Magellan. The Greater Cloud is situated in the constellation Dorado. The Lesser Cloud lies in a blank space between Hydrus and Toucan. See *Knowledge*, xiv. 51, and *Harvard Circulars*, Nos. 82, 96.

Magendie, FRANÇOIS (1783-1855), French physiologist, born at Bordeaux; was professor of anatomy at the Collège de France (1830), and member of the Academy of Sciences. He studied the action of various new drugs on animals and the human body, and particularly advanced our knowledge of nerve function. Author of *Formulaire pour l'Emploi et la Préparation de plusieurs Nouveaux Médicaments* (1821), and *Leçons sur les Fonctions et les Maladies du Système Nerveux* (1839); edited (1821-31) *Journal de la Physiologie Expérimentale*.

Magenta. See FUCHSIN.

Magenta, tn., prov. Milan, Lombardy, Italy, 15 m. w. of Milan; has manufactures of silk and matches. It was the scene of the victory of the French and Sardinians over the Austrians, June 4, 1859. Pop. (1901) 8,012.

Maggiore, or LOCARNO, LAGO, lake, lies mainly in North Italy, and is nearly 40 m. in length, with an average breadth of from 1½ m. to 3 m. It is very irregular in shape, and has an area of 82 sq. m.; its greatest depth is 1,221 ft., and its altitude is 636 ft. The upper part, for 9 m., is called the Lake of Locarno, and belongs to the Swiss canton of Ticino. Opposite Pallanza are the Borromean Is. This is the warmest spot on the lake, and a famous winter resort.

Maggot, a name applied to certain forms of insect larvæ, but often used without any great precision. A typical maggot is a larva in which legs are absent, and the head is not distinctly defined from the body. Such an animal hatches from an egg deposited by the parent in the midst of an abundant food-supply. A good example is the maggot of the common blue-bottle fly. As such maggots live concealed, and are typically colourless, the term is often applied by analogy to all insect larvæ of similar habit whatever their structure—for ex-

ample, the 'maggots' of plums are the caterpillars of the moth *Graptolitha funebrana*.

Magi, the priestly caste among the ancient Medians, and later also among the Persians. Magism is a worship of the elements, particularly of fire; and the Magi pretended to possess supernatural powers, whence our word magic. On the accession of the Persian Darius to the throne in 521 B.C., many of the Magi were massacred. Their headquarters were at Pasargade. It is suggested that the Magi were of Scythian origin, and became incorporated with the Medes.

Magic is the supposed supernatural art, or art of controlling the actions of spiritual or superhuman beings. It is divided into—(1.) Black magic, which is evil magic, or magic used with evil purpose—for example, to harm others or bring evil upon them. The evil eye and the use of evil spells come under this heading. (2.) Natural magic, which is the making use of superior knowledge of the powers of nature to work wonders—for example, the knowledge of chemistry and magnetism possessed by magicians in the middle ages enabled them to work natural magic. (3.) White magic, or the magic used for good purposes—as, for instance, for healing the sick or curing diseases by means of spells. White magic did not deal with witchcraft, sorcery, evil spirits, or enchantment. (4.) Celestial magic, or the supposed supernatural power that gave spirits influence over the planets, and the planets influence over human destiny. Astrology comes under this heading. (5.) Superstitious or goetic magic, or the invocation of devils and a supposed agreement between them and man, whereby they consented to serve him in his ends in return for some service by him. Magic is a very old science. In ancient Babylon and Egypt it flourished side by side with religion. In classical times magic became known as sorcery, and the magician was believed to hold communication with the unseen world. When Christianity spread, the gods of the heathen world were declared to be demons, with whom no converse should be held by good Christians. Amongst native races magic has always had influence, as among the Australian natives, who attribute to magic the various conditions of their health. If a man dies, it is by the magic of some enemy, and rarely from natural causes. In South America the native smokes narcotics, and generally brings himself into a state of spiritual intoxication, when he will prophesy good or evil, work spells, and exorcise spirits. In Africa

there is the medicine-man and rain-maker, who has power over life and death, and can influence the elements at will. India swarms with soothsayers, astrologers, and magicians; but these are different from the sorcerers, who live on their dupes. Amongst Mohammedans the belief in magic is rife, but it extends only to a belief in the efficacy of amulets, charms, exorcisms, and spells. Egypt and Chaldæa were the original homes of magic, and it is from the magic practised in those countries that all later practices have sprung. Amongst the Egyptians good magic—that is, magic for curative purposes—was much used; but black magic was considered a crime. Magicians were believed to have power over all nature animate and inanimate, and to have power to reinfuse life into the dead. To the magician the future was as well known as the past, and the thoughts of all were an open book. In Chaldæa, Assyria, and Babylon magic was chiefly astrological; the magicians studied the stars and gave horoscopes on the birth of all children. Greek magic consisted in the consultation of oracles and in the working of charms and spells. Roman magic consisted in divination and the drawing of signs from portents. Philosophic and theurgic magic was much used by the Jews, and Hebrew words came to be used when spells were worked. The pentagram became a sign of the brotherhood of magicians from this variety of the art. In all magic the influences of hostile action on the part of those who were implacable could only be terminated by the use of an amulet, secret name, magical formula or figure. In Egyptian magic each member of the body was placed under the protection of some amulet. Amulets were in numerous cases inscribed with magic formulae. See Horst's *Zauberbibliothek* (6 vols., 1820–6); Tylor's *Primitive Culture* (ed. 1903); Lenormant's *Magic among the Chaldeans* (Eng. trans. 1877); Conway's *Demonology and Devil Lore* (1878); V. Rydberg's *Magic of the Middle Ages* (Eng. trans. 1879); Fabart's *Histoire..... de l'Occulte, Magie, etc.* (1885); and Adam's *Witch, Warlock, and Magician* (1889). See also CONJURING, DIVINATION, WITCHCRAFT.

Magic Lantern. See OPTICAL PROJECTION.

Magic Squares consist of numbers set in a square in such a manner that the sums of the numbers in a row, column, and diagonal, are the same. In Fig. 1 five numbers are thus arranged. It will be noticed that each number occupies cells connected by

the knights' move in chess, and when the square is crossed the next cell may be taken in a contiguous square, and then the number may be moved to the corresponding cell in the original square; but other paths may be taken. Squares with different numbers in each cell may be formed by making another square

1	11	17	29	43
29	43	1	11	17
11	17	29	43	1
43	1	11	17	29
17	29	43	1	11

FIG. 1.

with four numbers, and adding the numbers in corresponding cells. This is De la Hire's method. Bachet arranged his numbers as in Fig. 2, and then transferring those outside the square to the corresponding compartments within

		10		0		2		
	20			12			4	
30			22			14		6
40		32			24			16
42			34			26		18
	44			36			28	
		46			38			
				48				

FIG. 2.

it, obtained a magic square, as in Fig. 2A. If one of the columns or rows in Fig. 1 be moved to the other side of the square, the properties of the square will not be changed; and if the path of the knight in chess be followed from

20	46	12	38	4
6	22	48	14	30
32	8	24	40	16
18	34	0	26	42
44	10	36	2	28

FIG. 2A.

the corner containing 17, we get 11 in the second row, and 1, 43, and 29 in the others. Such a square is called Nasik, after a town in India, where the inventor, Rev. A. H. Frost, resided. They may be made so that the paths along $n-1$ paths from a corner cell (n being the number of cells in the side of the square) may

contain constant sums, and so that the sum of any two figures equidistant from the middle one may be any given multiple or fraction of the latter; and other combinations may be arranged. Squares with an even number of cells require special adjustments; they also can be made Nasik.

Magilus, a genus of gasteropod molluscs, the members of which live among corals. They become gradually sunk in the coral, and would soon be entirely buried were it not that they possess the power of producing the shell into a tube whose growth keeps pace with that of the coral. The process goes on until the shell loses all trace of its original shape, its whorls being filled up with lime, while the animal occupies the tubular prolongation.

Maginn, WILLIAM (1793–1842), Irish journalist and critic, was born at Cork. Established in London in 1823, he carried on editorial and journalistic work, producing at the same time *The City of the Demons* (1828), a story which was one of his best achievements. In conjunction with Hugh Fraser, he founded *Fraser's Magazine* in 1830, Maginn's own *Homeric Ballads and Gallery of Literary Characters*, illustrated by Maclise, appearing in it. Owing to intemperance and a lack of conscientiousness, except in scholarship, Maginn died in great poverty. See *Memoir in Dublin University Magazine* (Jan. 1844).

Magister equitum, 'the master of the horse,' an official in the Roman state, who, in the time of the kings, commanded the cavalry; under the republic he only existed when a dictator was appointed.

Magliabechi, ANTONIO (1633–1714), Italian bibliomaniac and librarian, famous for his extraordinary memory, learning, and eccentric habits, was a native of Florence. He became (1673) librarian to the Grand-Duke Cosimo III. and his successors. At his death he bequeathed his library to the city of Florence.

Magna Charta. The Great Charter, called by Hallam the 'keystone of English liberty,' was granted by King John at Runnymede in the year 1215. In addition to the preamble, the Charter contains sixty-three clauses, and is partly remedial and partly, as Coke says, 'declaratory of the principal grounds of the fundamental laws of England.' Its principal provisions are:—(1.) A declaration that the Church of England is free. (2.) Feudal obligations are defined and limited. (3.) Law courts are to be held at fixed places, assize courts are established, and earls and barons are to be tried by their peers. (4.) No extraor-

dinary taxation without consent. (5.) No banishment or imprisonment save by judgment of peers and the law of the land. (6.) No denial, sale, or delay of justice. (7.) One standard of weights and measures. The Magna Charta was confirmed many times by different kings, and the form which appears in the Revised Statutes is the confirmation by Edward I. in 1297. See M'Kechnie's *Magna Charta* (1905).

Magnesia. See MAGNESIUM.

Magnesia. (1.) M. AD SIPYLUM, city, at the foot of Mt. Sipylus, N.W. Lydia; near it Scipio Asiaticus defeated Antiochus the Great of Syria in 190 B.C. (2.) M. AD MEANDRUM, city, near the Meander, S.W. Lydia; was destroyed by the Cimmerians about 700 B.C., and restored by Milesian colonists.

Magnesian Limestone contains a variable percentage of magnesium carbonate. The term is also used as synonymous with dolomite. The magnesian limestone of the north of England belongs to the upper subdivision of the Permian system, and attains its greatest thickness in Yorkshire and Durham. It is usually a pale yellow rock, containing few fossils, and yielding beds which are admirably adapted for building purposes. It was adopted for the Houses of Parliament. Quarries are worked at Mansfield and Bolsover.

Magnesite, a mineral consisting of magnesium carbonate. It bears a close resemblance to calcite, except that it is less easily soluble in acids and shows far less variety of crystalline forms. It occurs mostly as a secondary product associated with serpentine, is soft (h. = 3.5–4.5; sp. gr. 3.7), effervesces with dilute acids, and is used as a source of magnesium compounds and for the preparation of the magnesia bricks, obtained by calcination, and employed for furnaces where a basic lining is required.

Magnesium (Mg 24.36), a metallic element occurring, very widely distributed, in nature in combination, as magnesite ($MgCO_3$), dolomite ($MgCaCO_3$), Epsom salts ($MgSO_4 \cdot 7H_2O$), carnallite ($KCl \cdot MgCl_2 \cdot 6H_2O$), kieserite ($MgSO_4 \cdot H_2O$), and kanite ($KCl \cdot MgSO_4 \cdot 3H_2O$). Magnesium was formerly obtained by the action of sodium on dried carnallite, but is now prepared by electrolysis. The carnallite is fused by external heating in a cylindrical steel vessel, which is made the cathode of the dynamo, the anode being a carbon rod in a perforated porcelain cylinder that is immersed in the melted electrolyte. The magnesium separates at the cathode and rises to the surface, while the chlorine is

set free at the anode, and is collected in the porcelain cylinder and led off. Magnesium is a light (sp. gr. 1.7), white, hard, and fairly tough metal, that melts at $750^\circ C$ and boils about 1000° . It tarnishes but slightly when exposed to the air, but if heated catches fire and burns with a dazzling white light, forming the oxide. It is thus used for pyrotechnic purposes; and as the light contains a good proportion of rays of higher refrangibility, magnesium ribbon, and particularly powder ('flash-lamp'), is much used for photography by artificial light. Magnesium is also used as a reducing agent, to render nickel castings sound, and along with aluminium to form a valuable alloy, magnalium. Of the compounds of magnesium, that termed magnesia is properly the oxide, MgO ; but the name is also applied to the basic carbonates. These compounds differ somewhat according to the methods of preparation. The following are the principal commercial varieties: *Light magnesium carbonate* or *magnesia alba levis*, prepared by mixing cold dilute solutions of sodium carbonate and magnesium sulphate; and *heavy magnesium carbonate*, obtained when the solutions are concentrated and evaporated to dryness. Both are basic carbonates, approximating to the formula $3MgCO_3 \cdot Mg(OH)_2 \cdot 4H_2O$. Both are white powders, soluble in acids with effervescence, and mainly differing in their density. On calcination they yield the oxide, a white powder that does not effervesce with acids, and differs in density according to the carbonate it is prepared from, the two forms being *magnesia usta levis* and *ponderosa*. Sulphate of magnesium or Epsom salts is a white crystalline solid that is soluble in water and present in many mineral springs. Magnesium chloride is a deliquescent and very soluble salt that gives off hydrochloric acid when evaporated; a reaction is employed to prepare the latter substance. Magnesium chloride is also utilized to 'weight' cotton goods. Both the carbonates, the oxide, the sulphate, and their preparations, such as 'fluid magnesia', which is a solution of the bicarbonate in water containing carbon dioxide under pressure, and 'citrate' of magnesia, act as saline purgatives; the oxides and carbonate are also mildly alkaline. Of the rest of the magnesium compounds the natural silicates, such as asbestos, soapstone ('French chalk') and meerschaum are the most useful.

Magnetic Pole. See MAGNETISM, TERRESTRIAL.

Magnetic Units. See UNITS.

Magnetism. The natural magnet, lodestone or loadstone, called by mineralogists magnetite or siderite, the black or magnetic oxide of iron, was known to the ancients, and certain of its properties ascertained. Lumps of it tend to set themselves with a certain line in them approximately north and south; if dipped into filings of iron, these collect in a cluster round two places which are the ends of the above-mentioned line, and these two patches exert attraction or repulsion on similar patches on other lodestones. The patches are called the 'poles' of the magnet, and the line is the magnetic axis. If a strip of hard steel is rubbed from the centre to one end with one pole, and from the centre to the other end with the other pole of the lodestone, it is found to take on all the properties of the lodestone, and the end rubbed with the north-seeking pole turns to the south, and *vice versa*. The north-seeking poles are found to repel each other, and south-seeking poles repel each other, while north poles attract south poles. Such a strip of steel, if mounted on a pivot, forms a magnetic needle or mariner's compass. Such a bar magnet, if dipped into iron filings, will attract a bunch, thick at the ends, and thinning rapidly towards the middle. The strength of the pole is measured by the mechanical force it exerts on a similar pole, the unit pole being taken to be one that will exert a force of one dyne on a pole of the same strength placed at one centimeter distance. It was shown by Coulomb that the force is inversely proportional to the square of the distance from the pole.

The Magnetic Field.—The influence of a magnet extends out in all directions, and its sphere of influence is called its magnetic field. Its form was investigated by Faraday by the sprinkling of iron filings over a sheet of card or glass laid over a magnet. When the sheet is tapped, the filings arrange themselves in strings, which radiate out approximately from each end of the magnet, bending round, some in small, others in large curves, to join those from the other end. These lines are called 'lines of force,' as they indicate the direction of the combined magnetic forces from the two poles, and in general they take the form shown in Fig. 1, where the dotted lines indicate the direction of the force in the air, and the full lines inside the bar represent their assumed direction in the magnet. In a real magnet it will be seen that the magnetism is not confined to the ends, but spreads over a considerable length. But

for purposes of calculation it is convenient to consider the magnetism as concentrated at a point, and accordingly a point is selected near to each end, which will give the same magnetic effect on distant objects as the actual magnetism would do. These are

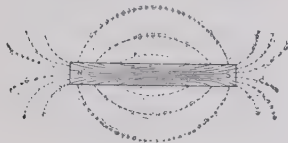


FIG. 1.

called the 'virtual poles,' and the distance between the two points is called 'the virtual length' of the magnet. The virtual length is from three-quarters to five-sixths of the real length, according to the shape of the bar. The lines of force of a virtual magnet are supposed to radiate out from the points (Fig. 2), and hence do not exactly correspond to those of a real magnet, but at a distance they are identical with those of Fig. 1. These lines of force may be drawn to represent not only the direction of the magnetic force, but also its intensity. Thus at points close to the poles the field is very intense, but the strength rapidly diminishes with distance from the magnet, and on account of the partial neutralizing effects of the two poles on each other the strength of field due to a magnet is inversely proportional to the cube of the distance along a straight line drawn through the centre of the magnet. To give a numerical value to the lines of force, the unit strength of magnetic field is taken as that produced at one centimetre distance from the unit pole, and is represented by one line of force

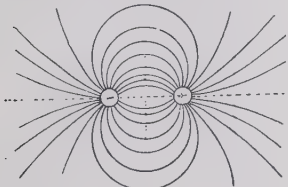


FIG. 2

through each square centimetre. Hence there will be 4π lines of force issuing from unit pole, since the area of a sphere of unit radius is 4π .

Magnetic Moment.—It can be shown that the influence of a magnet is proportional to the strength of the poles and to the virtual length. This product is called the 'moment of the mag-

net.' If a small magnet is placed at a point some distance from a large magnet, so that the lines of force may be considered sensibly straight over the short distance of its length, the mechanical action is a couple tending to turn the little magnet to a position parallel to the lines of force. In Fig. 3, if H is the strength of the field, a force Hm acts on each pole of strength m , and the moment of the couple is $Hml \cos \theta$ or $MH \cos \theta$, where M is the moment of the magnet. The strength of field is proportional to M/d^3 at a point distant d centimetres from the centre; but the exact value depends on the direction of d with respect to the magnetic axis, or, in other words, to the value of the angle θ between the line from centre to the little magnet and the plane perpendicular to the axis.

Magnetometer.—The moments of magnets may be compared by the magnetometer, which is simply a small pivoted or suspended magnet needle with a

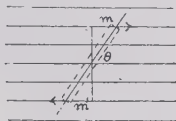


FIG. 3.

long pointer. This normally lies north and south. If a magnet is placed east or west of this, pointing towards it, the needle will be deflected through an angle θ ,

when $\frac{2M}{d^3} = H \tan \theta$, if H is the magnetic field due to the earth. Thus the deflections caused by different magnets are a measure of their respective moments. Magnets may also be compared by suspending them and causing them to oscillate about the axis of suspension. If the suspension thread is so thin that it exerts no appreciable torsional force, the time of a swing is proportional to $\sqrt{\frac{K}{MH}}$, where K is the moment of inertia, and H is the magnetic field of the earth.

Magnetic Action of a Current.—Oersted in 1820 found that there was a magnetic field round any conductor through which an electric current was passing. With a long straight conductor the lines of force form circles with the conductor as centre, and the strength of the field is proportional to the current, and inversely as the distance from the centre of the conductor. If the conductor is bent into a circle, the lines of force pass through the inside of the circle, and return on the outside. Setting up

a succession of circles on the same axis, with the current passing in the same direction in each, the lines of force will pass along the tube thus formed, returning outside. Such a succession of circles carrying a current is called a 'solenoid,' and is closely imitated by a coil of wire. It is found that the lines of force form much the same diagram as is shown in Fig. 1, with the addition that they can be identified inside of the tube as well as outside. The only difference is that they bend off in smooth curves instead of abrupt angles. Thus a solenoid will behave in all respects like a magnet, and its strength is proportional to the current and to the number of coils. The direction of the lines of force (i.e. the direction in which a north pole would be driven by them) depends on the direction of the current. In a straight wire, the direction of rotation of a right-handed screw (a cork screw) gives the direction of the lines of force, if the current passes in the direction in which the screw is travelling. Also in a solenoid the lines of force pass along the direction of travel, if the current passes round in a right-handed rotation. The end at which the lines of force emerge is the north pole of the coil, the other being the south pole. Such a magnet is called an electro-magnet.

The power of an electro-magnet is greatly intensified if the inside of the coil is filled with soft iron, and to a lesser extent if hard steel, nickel, cobalt (metal), or the magnetic oxide of iron is used. The iron is said to be magnetized by the coil, or to show 'induced magnetism,' and the magnetism so induced adds its magnetic effect to that of the coil. It was shown by Beetz that the molecules of iron are themselves magnets by nature, and that the absence of magnetic action by iron in the ordinary state is due to the mutual neutralization of the molecular magnets. But under the influence of an additional magnetic force, such as is due to a coil of wire carrying a current, the little magnets arrange themselves in regular order with consecutive north and south poles, and thus their magnetic effects are added together instead of neutralizing one another.

Ewing's Theory of Magnetism.

—Professor Ewing has shown that the mutual influence of the molecular magnets on each other will explain all the phenomena of magnetism in iron and other magnetic materials. The chief phenomena are as follows: when a very weak magnetic force is applied to the iron, the resulting magnetism is feeble, and is proportional to the force. An in-

crease in the force produces a very large increase in the magnetism; but a further increase is less and less effective, until the iron ultimately reaches a condition of magnetic saturation. There are thus three distinct stages, which correspond to three conditions of the molecular magnets. To begin with, the particles are arranged in mutually

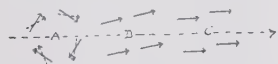


FIG. 4.

neutralizing positions (Fig. 4). A feeble force draws them slightly apart (A), as shown in the dotted line, producing a small magnetic effect. But with a stronger force the attraction of some of the poles is overcome, and the particles swing round to a new position (B), which has a much larger magnetic resultant, but the particles still influence one another to a certain extent.

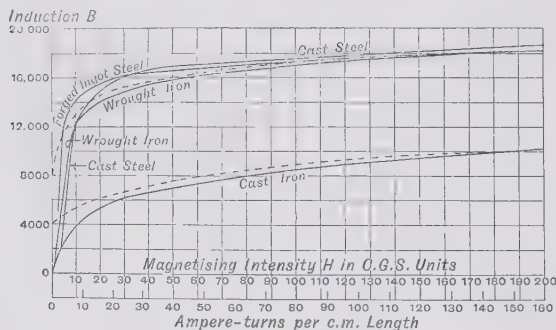


FIG. 5.

Finally, with a very strong force, the particles are arranged completely parallel to the force (C), and the maximum magnetic effect is produced. The positions of different sets of particles will probably vary, and hence the change is not quite sudden, but shows a gradual alteration. If a curve is drawn, in which ordinates represent the magnetization produced, and abscissae represent the strength of the magnetic force, the shape of the curve is always similar to those shown in Fig. 5. Different qualities of iron and steel show varied details, but the general shape is recognizable in all.

Residual Magnetism.—If a piece of iron so magnetized is removed from the coil, it is found to retain a portion of its magnetism. This is called 'residual magnetism.' In a long piece of hardened steel the magnetism is retained with very little loss for many years, and a moderate amount of jarring affects it but little.

But with very soft pure iron the magnetism is completely lost if the iron is jarred. Short thick pieces lose their magnetism very easily, because the lines of force from the poles endeavour to return through the metal, and in so doing tend to reverse the magnetism. Thus, a bar may be regarded as made up of a number of thin bars, all with their north poles together, and each north pole tends to demagnetize the neighbouring ones. If the piece is very thin in relation to its length, this effect is much diminished, since there would not be so many component pieces, and therefore magnets are preferably made long and thin if they are required to be permanent.

Forms of Magnets.—The straight bar magnet is often used for convenience, but it is not so permanent as the horseshoe form. For in this the two poles are brought near together, and the lines of force pass directly across

Magnetization of Magnets.—Small magnets, such as compass needles, can be made by stroking the steel with each pole of a bar

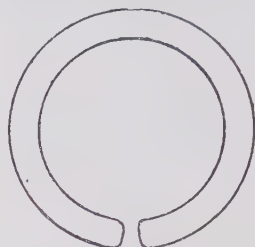


FIG. 6.

magnet in turn. But a more uniform magnetization can be obtained by placing the little magnets between the poles of a powerful electro-magnet of horseshoe shape. Very long magnets are put into a coil of wire, and a powerful current is sent round the coil for a second or two. Horseshoe magnets can be dealt with in the same way by using suitably-shaped coils. For large magnets it is preferable to build up the magnet out of many thin strips of steel of the shape required, each separately magnetized. By this means the whole of the material becomes equally magnetized throughout.

Hysteresis.—The retention of the magnetic state produces a very important effect when the iron is subjected to a changing magnetic field. Let the magnetic field be produced by an alternating or reversing current. Then the direction of magnetization will be reversed at every reversal of the current, and the change will take place gradually. If a cycle of magnetization is followed through, it will be seen that, owing to the residual magnetism,

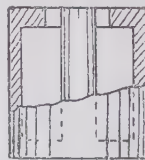


FIG. 7.

the narrow air gap, with less tendency to return along the metal. A circular magnet with a narrow space between the poles (Fig. 6) affords a very permanent form. Another form is the tubular magnet (Fig. 7), in which one of the limbs envelops the other, and the air gap becomes a narrow ring round the centre pole.

Keepers.—The tendency to self-demagnetization can be much reduced by bridging the gap with a piece of soft iron, called a keeper. Although a high grade of tool steel makes excellent magnets, the addition of tungsten or chromium improves the steel, rendering the magnet more lasting. The metal is hardened by rapid cooling from a red heat; but where great constancy of strength is required, as in some forms of electric measuring instruments, a slight tempering is advisable. The magnets are boiled in oil and magnetized several times in succession.

the iron will remain magnetized when the current has died down to zero, and only reverses by the application of a greater or smaller force. The same effect occurs at the next change, so that the state of the iron always lags behind the state of the magnetic field. The effect is called 'hysteresis.' In a diagram the magnetization curve is seen to be a closed one (Fig. 8); and as the magnetic field is of the nature of a stress, and

the resulting magnetization is a strain, the closed curve indicates work done on the iron, which is converted into heat in the metal. By a rapid alternation of the force the temperature quickly rises, and in machinery, when this occurs, due allowance must be made for an efficient method of

swing round to a reversed condition of 2, with gradually increased alignment up to E'. Then the same phenomena occur in the second half of the cycle. A strong verification of Ewing's theory was afforded by Bailly's discovery that the hysteresis in a cylinder rotating in a magnetic

field is due to an electric current circulating in the atom. The modern view of the electric constitution of matter supports this view, while modifying the idea of a current into a circulation of electrons.

Effect of Temperature.—If iron is heated it becomes more and more susceptible to magnetism, but the saturation value becomes less and less. Both effects continue up to a red heat, when it suddenly ceases to be affected by a magnetic force, and it becomes no more magnetic than the non-magnetic metals. On cooling, it again becomes magnetic; but Dr. J. Hopkinson showed that some alloys of iron remained non-magnetic on cooling to quite low temperatures, then suddenly regaining their magnetic properties. After heating to a red heat, all residual magnetism disappears, and the iron, after cooling, is completely demagnetized. Long-continued moderate heating has the effect of increasing the coercive force and the hysteresis loss, a temperature of 100° Centigrade prolonged for many days producing a great increment, which remains after the iron is cooled again. This is allowed for in the calculation of the losses in transformers, since these will be smaller at first and gradually increase as the transformer is used. Heating to a red heat completely removes this new condition.

Magnetic Induction.—It has been explained that when a bar

cooling. If the values of H , the force, and I , the intensity of magnetization, are expressed in C.G.S. units, then the area enclosed gives the loss of energy per cycle in ergs. The more strongly the iron is magnetized the greater is the loss, and Mr. Steinmetz has shown that it is approximately proportional to $aB^{1.6}$, where B is the magnetic induction. In hard steel the coefficient a is large, whereas in very pure soft iron and in certain mild steels a is small. Fig. 9 shows several curves obtained from different qualities of metal. Very careful annealing is essential for low values of this; and since this effect reduces the efficiency of transformers and dynamos, every care is taken to use the softest Swedish iron in all places where the magnetism is periodically reversed. The value OB (Fig. 8) is called the 'retentiveness,' and OH the 'coercive force.' In hard steel the coercive is great; but the retentiveness of soft iron is often greater than that of hard steel, though a very small force is sufficient to destroy it. The explanation of this is easily seen from Ewing's theory. After state 2 a new arrangement of particles is produced, which is fairly stable, and the particles in consequence keep themselves substantially in the same position, while the force falls to zero. Hence, though there is some falling off of the magnetic state from E to R (Fig. 8), the iron is still fairly strongly magnetized. But as the force increases in the reverse direction, the attractions are gradually weakened, until there is another revolution, and the particles

field reached a maximum value at an induction of some 16,000, and rapidly diminished for higher values, becoming zero when the iron is saturated. In this condition the molecular magnets are never allowed to form new combinations, since the magnetic field only changes in direction, but not in strength. Therefore each molecule rotates individually as the field changes, and

of iron is magnetized by a coil the magnetic effects of both are added. It is usually more convenient to consider both effects together, and to reckon the total number of lines of force produced. A magnetic field of strength H produces H lines of force per sq. cm. in air, and it

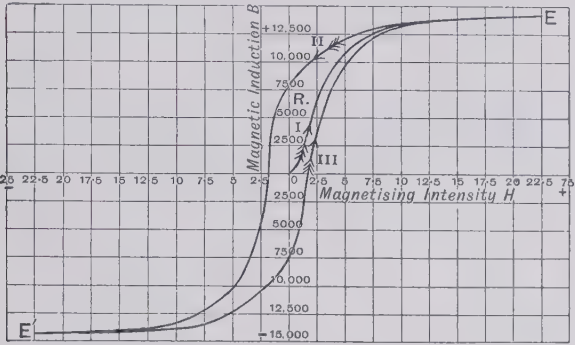


FIG. 8.

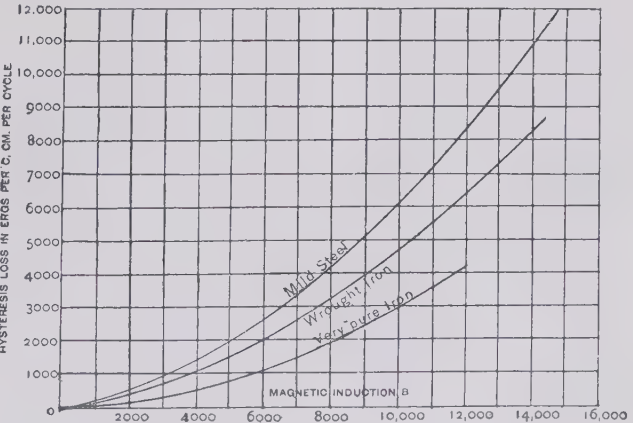


FIG. 9.

hysteresis is eliminated. This proves that the control of the magnets is due to the magnets themselves, and not to friction or other mechanical cause.

Origin of Magnetism.—It was suggested by Ampère that the magnetism in an atom of iron could be explained by assuming

will produce an intensity of magnetization I in the iron. Therefore $4\pi I$ lines of force per sq. cm. will be due to the iron, and the total number will be $4\pi I + H$ per sq. cm. This is called the 'magnetic induction,' and is represented by B . If B is the total result produced by the force H , the ratio of B/H is called the 'permeability' of the iron, and is represented by μ . The ratio of I to H is called the 'susceptibility,' and is denoted by k . Hence, since $I = kH$, then $\mu = 1 + 4\pi k$. The permeability of air and non-magnetic substances is taken as unity, or the unit magnetic induction is taken as that produced by unit magnetic force in air. In iron the permeability depends on the quality of the iron, and it is also by no means constant for any one sample. For small and moderate values of B the per-

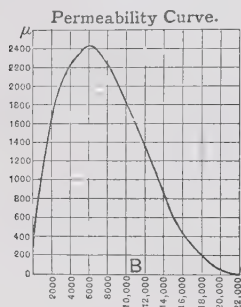


FIG. 10.

meability is high, and as the iron approaches saturation the ratio becomes less and less. In Fig. 5 was shown the relation of B to H , and Fig. 10 shows the relation of μ to B for ordinary soft iron. The maximum value of μ may rise to 4,000 in the softest iron, showing what a vast difference is produced by the presence of iron. Alloys of iron or various kinds of steel are for the most part strongly magnetic, but less so than pure iron. Certain steels are even more magnetic than pure iron, while a manganese steel with 25 per cent. of manganese is almost non-magnetic. In all cases mechanical strain reduces the permeability and increases the hysteresis, well-annealed metal being the most permeable.

The Magnetic Circuit.—If a line of force is traced out completely, it will be found to return into itself, making a closed path, or into the opposite pole of a magnet, through which it may be considered to pass to the initial pole. This path is called the 'magnetic circuit.' If the lines of force pass round an iron ring

magnetized by a coil of wire, the circuit is very definite, as all of the lines of force are confined to the ring. But with a straight bar magnet or straight coil of wire the path through the air is very varied in length and direction, and the idea of a circuit is difficult to apply. In many magnetic appliances, however, the path is wholly or to a great extent through iron, and this conception affords a very simple means of calculation. If the source of magnetism is a coil of wire, as is usually the case, the total magnetizing influence is called the 'magneto-motive force,' and this equals the magnetic force through each part of the circuit, multiplied by the length of the path. It may be shown that this product = $4\pi nC$, where n is the total number of windings in the coil, and C is the current in c.g.s. units. If the current is expressed in amperes, the expression becomes $\frac{4\pi}{10}nC$, or $1.25nC$.

Magnetic Flux.—The total number of lines of force passing through a coil and round the magnetic circuit is called the 'magnetic flux.' This is dependent on the magneto-motive force (M.M.F.), and on the nature of the circuit. The ratio of M.M.F. to magnetic flux is called the 'reluctance of the circuit.' It is

equal to $\frac{\text{length}}{\text{area} \times \text{permeability}}$; or,

with a circuit of varied area and permeability, the reluctance

$$= \frac{l_1}{A_1\mu_1} + \frac{l_2}{A_2\mu_2} + \frac{l_3}{A_3\mu_3} + \text{etc.}, \text{ where}$$

l_1, l_2, l_3 are portions of the circuit through which the area and permeability remain unchanged. Thus, in a simple circuit of a uniform iron ring, the flux is easily calculated if the quality of iron is known; but it must be remembered that the value of μ varies with the induction, or the number of lines of force per unit area. It is more usual to decide on a definite value for the induction and total flux, and from this to calculate the M.M.F. required to produce it. If the circuit contains a narrow air gap, a second term must be used; and as the permeability of the iron may be over 1,000, and that of the air is 1, it is obvious that even a narrow air gap greatly increases the reluctance of the circuit. The calculation is complicated by the fact that the path from one side of the gap to the other is not a straight one. The lines of force spring outwards or repel one another, thus increasing the area and decreasing the reluctance; and this decrease is difficult to calculate.

In the calculation of dynamos, only those lines of force are useful which pass through the core of the armature, and those which escape the core are called 'leakage lines.' It is therefore convenient to express the ratio of total lines (which all pass through the iron) to the useful lines as a leakage coefficient, which may vary from 1.1 up to 1.4 in usual designs. Then the equation be-

$$\text{comes } \frac{4\pi nC}{10} = \frac{N_1 l_1}{A_1 \mu_1} + \frac{N_2 l_2}{A_2 \mu_2} + \text{etc.},$$

where N_1, N_2 are the number of lines through the areas A_1, A_2 , and A_2 will represent the area of the air gap between the pole face and the core, while the leakage lines are ignored in this part of the expression. The leakage coefficient may be calculated, but is usually well known for any particular design of dynamo.

It is clear that this expression is similar to that used for an electric circuit—*viz.* E.M.F. = $C \times R$. Current corresponds to magnetic flux, and resistance to reluctance. The calculation in electric circuits is, however, considerably simpler, because the conductivity of the material is constant, whereas the permeability of the iron is variable, and also because in the electric cir-

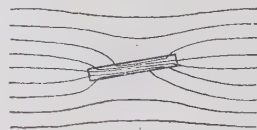


FIG. 11.

cuit the path is almost always strictly enclosed in insulating materials, whereas there is no magnetic insulator, and the lines of force are free to spread. That they confine themselves with some completeness to a path through iron is only due to the high permeability of the iron as compared with air; and any constriction of the iron path at once causes emergence of some of the lines seeking an alternative path. When the problem is more general—as, for example, a piece of iron placed in any position in a magnetic field—the calculation of the effect is much more complex. The iron acts as if it draws the lines of force to itself; for, as it offers an easier path than the air, the lines will bend round so as to enter and lie in the iron. Thus it distorts the magnetic field, the distortion being greater when the length of iron in the direction of the lines of force is considerable, for it offers an important reduction of reluctance. A short piece of iron, especially a sheet placed perpendicularly to the direction, exerts little influence. Fig. 11

shows the effect of a bar of iron in an otherwise uniform field. It will be seen that near the ends the field is strengthened, while at the sides it is reduced. Hence, where observations of the earth's magnetic force are to be made, it is very important that no iron pipes or girders are near.

Magnetic Screening.—Although no material is non-permeable, and hence no space can be completely protected from magnetism, nevertheless, by surrounding a space by a thick iron shell the lines of force of (say) the earth are induced to pass round the space through the walls of the shell, and the inside is almost completely screened. A second box inside the first gives an improved effect. The method is used to protect delicate galvanometers from the disturbing influence of external magnetic effects. Since the action is due to the lower reluctance of the iron, it is important to use the softest iron, and to make the walls of considerable thickness.

Tractive Force.—Since the opposite poles of two magnets attract each other, there will be a similar attraction between the cores of two electro-magnets, or between the two parts of the core of a single electro-magnet. This is used in electro-magnetic appliances for producing mechanical movement, which can be controlled by the electric current in the coil, and can thus be operated at a distance. Electric bells and indicators, telegraph sounders, and many other contrivances are examples. Since the lines of force pass from one piece of iron to the next, one end will be a north pole and the other a south pole, and hence attraction will result. Another explanation is afforded by stating that the iron tends to move so as to shorten and improve the magnetic circuit—i.e. to reduce the reluctance. This is usually effected by reducing the air gap between the iron parts. The calculation of the force is rendered difficult by the leakage of the lines of force, which invariably occurs at an air gap. If the air gap is very short compared with its area, the tractive force is approximately equal

to $\frac{B^2 A}{8\pi}$ dynes, when B is the induction, and A is the area of surface in sq. cms. Or it may be written $\left(\frac{B}{5000}\right)^2 A$ kilograms.

Thus, if the iron is strongly magnetized, so that B has the value 20,000, the pull will be 16 kilograms per sq. cm., or 2 cwt. per sq. in. It will be noticed that a high induction is more important than a large area, and therefore the poles of electro-magnets for lifting purposes are reduced

at the ends, in order to concentrate the magnetic effect. The appliance is used for lifting iron plates by employing an electro-magnet at the end of the chain of the crane instead of a hook or claws. Fig. 12 shows a form of magnet for lifting purposes. Another application is seen in

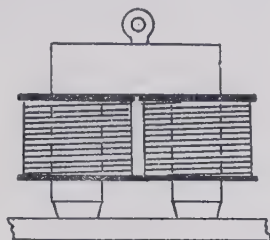


FIG. 12.

the magnetic clutch, by which the two halves of a line of shafting may be connected, or a pulley on a shaft may be fixed to it or run free. Fig. 13 shows a simple form. A single circular coil is embedded in the face of one-half of the clutch, forming an electro-magnet of concentric form, and the other half acts as

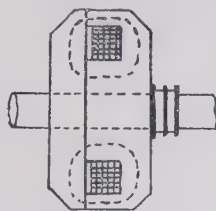


FIG. 13.

a keeper or armature. Current is taken to and from the coil by brushes of wire sliding on brass rings insulated from the shaft. When current is 'on,' the two halves are drawn together, and the one drives the other by friction. On stopping the current, the clutch is instantly released.

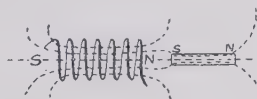


FIG. 14.

Coil and Plunger Mechanism.—If a bar or plunger of iron is brought near to a coil carrying a current, the bar is sucked into the coil, until it reaches the central symmetrical position. The action may be described in different ways. In Fig. 14 is shown the coil with iron core. Some of the lines of force pass into the near end of the core, and emerge

at the farther end, thus magnetizing it. The end near to the coil is in a strong field, and the attraction is great; while the more distant end is in a weak field, and the repulsion is therefore weak. Hence there is a pull into the coil, which continues until the pull on each end is equal, which will occur when the centre of the core is in the centre of the coil. This may be expressed by stating that soft iron moves to the strongest part of the field, which will be the centre of the coil. Or it may be said that the iron moves so as to improve the magnetic circuit, and to decrease the reluctance. As the part inside the coil is the more important on account of its small area through which all the lines of force must pass, these different statements have the same meaning. This action is useful when a longer movement is required than in the foregoing examples. For the keeper arrangement, while affording a powerful pull over a short distance, is ineffective if the keeper is at a distance. With the plunger, a long coil may be used, and the effective distance of action extends proportionally. The calculation of the pull is somewhat complex, and depends upon the shape and size of both coil and plunger. With both of the same length, the maximum pull is obtained when the plunger is about half-way into the coil.

Electric Measuring Instruments.—The movement of small pieces of iron in one of the above described ways is much used in instruments for measuring electric current. A simple plunger may be used, hung on the end of a lever, and the movement of the other end of the lever is indicated on a scale. Or the plunger may be hung from a spring balance, and the extensions of the spring are a measure of the current. In others the iron is drawn away from the axis towards the side of the coil, when in short coils the field is strongest. In others the iron lies across the axis, and is turned parallel to it. Various other forms are in use.

Testing of Magnetic Properties of Iron.—The measurements required are the permeability and the hysteresis. The permeability is tested by measuring the induction produced by a measured magnetic force. The latter, depending on the current, the number of coils, and the length of the magnetic circuit, is easily calculated. The induction may be measured by wrapping a small 'search' coil round the sample of iron, the ends of the coil being connected to a ballistic galvanometer. A sudden increase in the current causes an increase in the number of lines of force which

pass through the coil, thus inducing an electro-motive force in the search coil, and a momentary current flows round the coil and galvanometer. The consequent swing of the galvanometer needle measures the increase in the magnetic induction in the iron, and by successive increments of current the iron is magnetized by measured amounts. The actual process and the calculations involved are too lengthy to be entered into here. Instead of a search coil and a ballistic galvanometer, the magnetic state of the iron may be measured by a magnetometer if the iron is in the form of a long straight wire, since its magnetic moment or the strength of the magnetic pole induced at the end is measured by the deflections of the small magnet. There are many special instruments for the purpose, among which may be mentioned Professor Ewing's permeability bridge, in which a bar under test is compared to a standard iron bar, and both are brought to the same magnetic condition by varying the currents in the respective coils in which they are placed. Thus the values of the magnetic force which each requires are found, and the permeability of the standard being known, that of the sample under test is readily calculated. Other forms depend on the tractive force. If two rods, placed end to end in a magnetizing coil, are pulled apart, the force required to separate them is proportional to B^2 , as stated above. Hence, by measuring the current in the coil and the mechanical force, the values of B and μ are ascertained. In all these tests it is essential that the length and area of the magnetic circuit should be known, and therefore the circuit is made entirely of the sample to be tested, or else parts of it are completed by very thick blocks of soft iron, the reluctance of which may be neglected. In the magnetometer method this is obviously impossible, since the return path is through the air. Hence it is essential that the iron rod should be very long and thin, in order that the return path may be of small influence.

Hysteresis Measurement.—In the ballistic or magnetometer methods, a complete cycle may be carried through, and by plotting and measuring the area of the curve so obtained (Fig. 8), the hysteresis may be measured. Other curves are then obtained for different maximum values of B , and the hysteresis curve (Fig. 9) is thus determined. But the value of the hysteresis is usually required when the iron is to be subjected to an alternating field, and each alternation causes

a definite loss of energy. The loss may thus be directly measured if a coil of wire is wound round a simple magnetic circuit composed of the iron to be tested, and an alternating current is passed through the coil. The power absorbed is measured on a wattmeter, and from a knowledge of the speed of alternation and the volume of the iron, the loss per cycle per cubic centimetre is determined. To reduce eddy currents in the iron, it must be in the form of thin plates, and the apparatus is built up by piling narrow strips on each other so as to make a hollow square of iron. In Ewing's hysteresis tester a small square rod is built up of narrow strips of iron, and is clamped crosswise on an axle turned by a handle. A

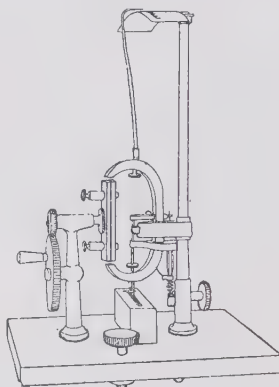


FIG. 15.

large horseshoe magnet is placed opposite to the axle, so that the sample revolves between its poles. When it is along the line of the poles it becomes magnetized, and as it passes away the residual magnetism in it attracts the magnet. The ordinary attraction of soft iron on a magnet is eliminated, since this will act in opposite directions as the sample approaches the poles and recedes from them; but the residual magnetism will always act in the same direction, and if the magnet is hung on bearings or knife edges, it will swing over in the direction of rotation of the sample. The extent of the deflection is a measure of the hysteresis in the specimen. Fig. 15 shows the apparatus. A similar method has been used for measuring the hysteresis in a rotating magnetic field, which represents the condition of a dynamo armature. The sample is cylindrical, and is placed between the poles of a magnet which is rotated. The pole pieces are cut to a cylindrical form, the axis of which is the axis of rotation, and the sample is also concentrically placed.

The sample is held in pivots, and the hysteresis produced when the magnet revolves tends to turn the sample round with the magnet. Movement is checked by a spring attached to the sample, and the deflection measures the hysteresis in the iron.

Magnetism in other Materials.—It has recently been discovered that certain alloys of the non-magnetic metals copper, manganese, and aluminium are almost as magnetic as cast iron, and show residual magnetism and change of permeability in the same manner. For all ordinary purposes, however, metals other than iron, nickel, cobalt, and magnetite may be considered non-magnetic. But careful examination shows that many substances are feebly magnetic. The salts of iron, nickel, and cobalt, and oxygen are the most conspicuous, oxygen in the liquid state being appreciably magnetic. On the other hand, certain substances, notably bismuth metal, are less affected than empty space. They are called 'diamagnetic bodies,' and their permeability is less than unity. Lines of force will tend to avoid passing through them, and they will be repelled out of a magnetic field. But the effect is very small. No residual effect has been discovered in diamagnetic bodies. See Du Bois's *The Magnetic Circuit* (trans. Atkinson, 1896) and Ewing's *Magnetic Induction in Iron and other Metals* (1904).

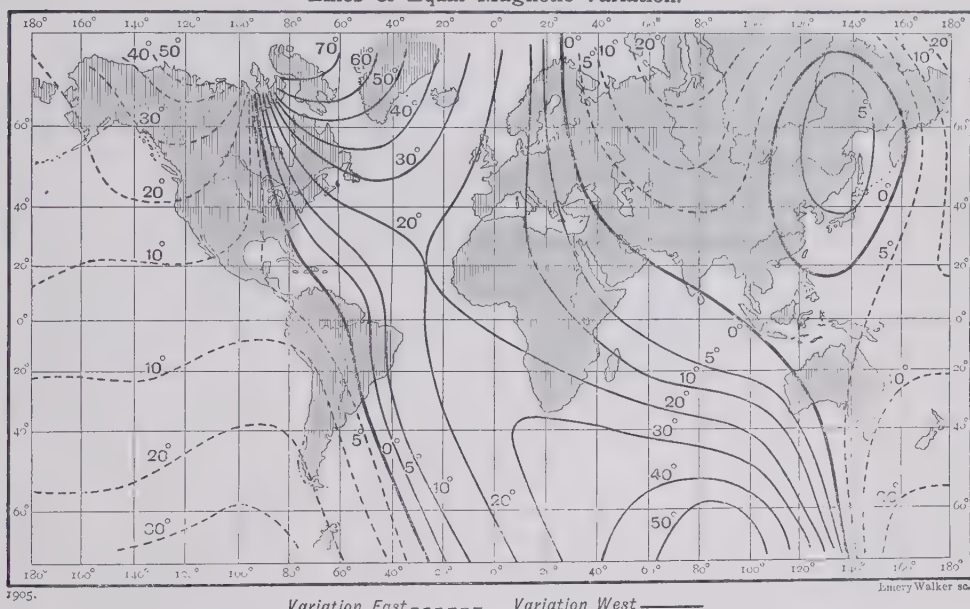
Magnetism, TERRESTRIAL. It was shown by Gilbert in the year 1600 that the facts then known about the magnetic condition of the earth's surface could be explained by assuming that the earth was a uniformly magnetized sphere, the magnetic poles of which approximated to the geographical poles. With small modifications, this theory has been accepted universally, but the cause of the magnetization is still completely obscure. It is well known that the compass needle points approximately north and south over the whole of the globe, except in the Arctic and the Antarctic regions. The variation from the true north—*viz.* the angle between the direction of the compass at a certain place and the line of longitude through that place—is called the 'declination' for that place. Again, if a compass needle is balanced on a horizontal axis through its centre of gravity, so that gravity has no tendency to set it in any position, it will lie at an angle to the horizontal, called the 'angle of dip' or 'inclination,' which is approximately zero at the equator, and becomes greater as the latitude increases. In the northern hemisphere the north-seeking end of the needle

points downwards, while in the southern hemisphere the reverse is the case. As the needle is under the control only of the magnetic field, it follows that the lines of magnetic force (see **MAGNETISM**) enter the surface of the earth at a gradually increasing steepness, until at or near the poles they are perpendicular to the surface. This is the distribution afforded by a uniformly magnetized sphere, and was the basis of Gilbert's theory. The strength of the magnetic field is approximately equal at points along a line of latitude, but changes from the equator to the poles. The total force is at a maximum at the poles, but the horizontal component—*viz.* that part

clearly due to magnetic rocks, and others are very possibly caused by these rocks at considerable depths. Since basaltic rocks are magnetic, it is not improbable that great masses of magnetic material exist of which there is no direct evidence. The declination, dip, and horizontal force vary slightly at any one place during the course of the day and night, the change being a gradual shift backwards and forwards about the average values. The variation is greatest in summer and least in winter. Thus it is obviously caused by the heat of the sun; but the manner of its influence is uncertain. There is a marked change which occurs over periods of eleven years, and

sun, or indirectly through changes in the upper atmosphere, is not known. They are of sufficient strength to interfere seriously with telegraphy, since the changes in the earth's magnetism induce currents of electricity in the telegraph wires. For navigation purposes the value of the declination at different parts of the surface of the earth is set out in charts, which, however, require correction from time to time. Charts for scientific purposes are also made, showing the dip and the value of the horizontal and vertical components. The form adopted is to draw lines round the earth through places at which the declination and dip have equal values, the former being called

Lines of Equal Magnetic Variation.



which affects the ordinary compass needle—is at a maximum at the equator.

Variations.—By supposing the axis of the magnet to emerge at a spot lat. 78° N. and long. 68° W. of Greenwich in the region of Baffin Bay in Canada, and at a corresponding spot near the south pole, and shifting all the magnetic lines uniformly, a fairly correct idea of the magnetic distribution is obtained (Fig. 1). If another and a weaker pole is assumed in N. Siberia, and a similar one near the south pole, a slight distortion of the distribution is caused, which gives a more accurate representation. In addition to this there are very many local variations, some of which are

corresponds to the occurrence of sun spots. There is also a secular or very slow change in the position of the magnetic axis of the earth. Thus in the year 1570 the declination at Greenwich was 11° east of north, in 1660 it was due north, in 1800 24° west of north, and is now decreasing, being 15° west of north. From time to time there occur sudden fluctuations, which may extend over several degrees, called magnetic storms. They seem to be connected frequently with brilliant displays of the aurora borealis, and are usual during disturbances in the sun, as shown by sun spots; but whether they are due to the direct magnetic influence of the

'isogonals,' and the latter 'isoclinals.' The isogonals, at which the declination is zero, are called 'agonic' lines.

Mariner's Compass.—The mariner's compass is in essentials a small steel magnet pivoted or suspended at its centre, so as to be free to move in a horizontal plane. Obeying the magnetic laws (see **MAGNETISM**), it comes to rest along the line of magnetic force which passes through its centre. Therefore it does not, in most cases, indicate the true north, and the correction for declination must be applied. Lord Kelvin's compass is a great improvement on the single magnet form, in that several long thin needles are employed, fixed on

a light framework. The thin needle is capable of greater magnetization than thick ones, and by spacing them widely the demagnetizing action of each on the others is much diminished. The outer needles are shorter than those at the centre, thus allowing a very perfect distribution of magnetism, in addition to utilizing a large part of the circular space. The magnet system is often floated in a liquid, to check oscillations; and the case is hung on gimbals, to allow for the movement of the vessel. See W. Watson's *Text-book of Physics* (1900).

Magnetite, or magnetic iron ore, Fe_3O_4 , is an important ore

mon Prayer it occupies the position of the first canticle in the office of Evensong.

Magnificent, a British first-class battleship (14,900 tons) launched in 1894. The name was introduced into the navy in 1766.

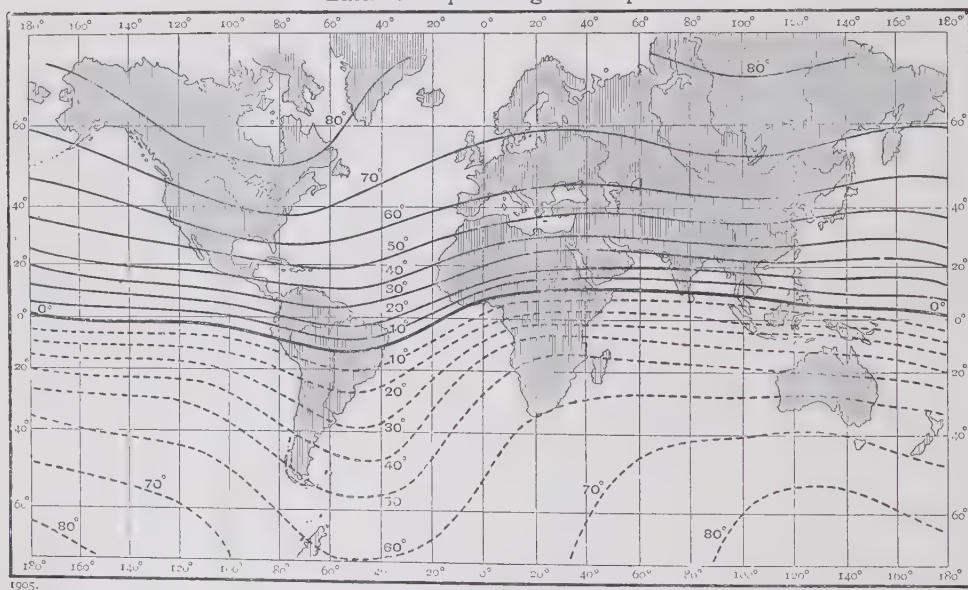
Magnifying Glass. See LENSES.

Magnitude, a conventional measure for apparent stellar brightness. Hipparchus and Ptolemy divided the stars into six classes or magnitudes. The system, later extended to telescopic stars, was rendered precise by the adoption of Pogson's light-ratio (1850). On this scale, the brightness of stars of adjacent magnitudes is in the proportion 2.512

and conspicuous, solitary flowers, usually of great beauty, and often very fragrant. They are readily grown in moderately rich soil, and are not difficult to propagate by means of seeds or layers. Many of the species do well in the open in the milder parts of Britain, but all profit by a little shelter, such as the protection of a wall. The hardiest of all the magnolias is *M. acuminata*, the cucumber tree, a deciduous species from N. America, growing to about fifty feet in height, bearing in early summer large yellowish-green flowers, followed by cucumber-like fruit.

Magnus, kings of Norway, chief among whom were:—MAGNUS, the

Lines of Equal Magnetic Dip.



Above the Magnetic Equator the North Pole dips ——— Below the Magnetic Equator the South Pole dips - - - - -

of iron that is worked to a very large extent in Scandinavia (e.g. Dannemora). It is found as a heavy (sp. gr. 5.2), brittle black solid, with a metallic lustre (h. = 6). It has magnetic properties, though not many specimens exhibit definite poles.

Magneto-electricity. See ELECTRICITY, CURRENT.

Magneto Ignition. See MOTOR CARS AND CYCLES.

Magnetometer. See MAGNETISM.

Magnificat, the hymn of the Virgin Mary. Its use in the services of the church dates back to at least the commencement of the 6th century. There are English versions of it from the 14th century. In the Book of Com-

to 1, the light-ratio being further defined as the number of which the logarithm is 0.4. Gradations of brilliancy, discriminated by modern astronomers to one-tenth of a magnitude, are expressed by decimals; fractional and negative numbers indicate degrees of brightness exceeding first magnitude. Thus, a star of zero magnitude gives 2.512 times the light of one of standard first magnitude, and the negative magnitude of Sirius (−1.6) signifies its being 1.6 times brighter still. The sun's stellar magnitude is approximately −26.5.

Magnolia, a genus of hardy or tropical shrubs or trees belonging to the order Magnoliaceae. They have large, entire leaves

Barefooted' (1073–1103), reigned from 1093; incorporated the Hebrides and Orkneys, together with the Isle of Man, in 1102. He made a descent upon Ireland, but was slain in battle, and buried at the cathedral of Down.—MAGNUS, 'the Lawgiver' (1238–80), crowned at Bergen in 1261. Besides the Norwegian codes, he compiled the code called Jarnsida for Iceland (1271–2). Under him the crown was declared to be hereditary and the realm indivisible. He restored the Hebrides to Scotland in return for an annual tribute. He was a friend to the clergy, and granted to the Hanseatic League privileges injurious to the commerce of his country.

Magnus, or **MAGNI**, **OLAUS** (1490-1558), Swedish historian, born at Linköping; was made archbishop of Upsala, succeeding his brother Johannes. He was author of *Historia de Gentibus Septentrionalibus* (1555).

Magnus, **SIR PHILIP** (1842), English educationist, born in London; director and secretary of City and Guilds of London Institute (1880-8); is a voluminous writer on general scientific and technical subjects, particularly on industrial problems in relation to technical training. Author of *Lessons in Elementary Mechanics* (new ed. 1892).

Magnusson, **ARNI**, or **ARNE** (1663-1730), Icelandic historian and archaeologist, born in W. Iceland; became professor of history and Danish antiquity in the University of Copenhagen. Author of *Incerti auctoris Chronica Danorum et precipue Islandie* (1695) and *Testamentum Magni-Regis Norvegie* (1719).

Magnusson, or **MAGNUSSEN**, **FINNUR** (1781-1847), Icelandic archaeologist, born at Skalholt, Iceland; became professor at the University of Copenhagen (1815), and was university archivist at the time of his death. He was the author of a work on the *Elder Edda* (1828) and *Priscæ Veterum Borealum Mythologie Lexicon* (1828).

Magos, Carthaginian soldier, the youngest son of Hamilcar Barca, and brother of Hannibal. At the battle of the Trebia, in 218, he commanded the ambushed troops whose attack decided the victory, and at Cannæ he shared with Hannibal the command of the main Carthaginian force. Soon afterwards he was sent to Spain. Then for several years he carried on a war against the Romans, along with his brother Hasdrubal and Hasdrubal's son Gisco. His decisive defeat occurred in 206 B.C. In the next year he invaded Liguria, in the north of Italy, and caused the Romans some trouble for two years; but the Roman invasion of Africa caused the Carthaginians to recall him, and he died on the way home.

Magog. See **GOG AND MAGOG**.

Magpie (*Pica rustica*), a member of the crow family (Corvidæ), and almost omnivorous in diet. Its unpopularity with game-preservers is due to its fondness for the eggs and young of the larger birds; but it benefits the farmer by attacking mice, rats, voles, as well as snails, slugs, and so on. The familiar 'pied' plumage renders the bird readily recognizable; in the male the black feathers are beautifully glossed with green and violet. In a full-grown male, measuring about eighteen inches in total length,

the long tail feathers may be eleven inches long. The nest is made of thorny sticks, mingled with roots and turf, and lined with clay. The eggs are from six to nine in number. The magpie is widely distributed over Europe and Asia, and also occurs in N. America. In N. Africa and in California it is replaced by allied species.



Magpie.

Maguey. See **AGAVE**.

Magus Muir, reclaimed tract of land 3½ m. W.S.W. of St. Andrews, Fifeshire, Scotland; the scene of Archbishop Sharp's murder by Cameronian Presbyterians on May 3, 1679.

Magyars (properly **HUNGARIS**, **HUNGARIANS**), a Finno-Ugrian or Finno-Turki people, who about 550 A.D. moved from the Ural region to the Volga, and after a long sojourn on the Russian steppe were driven W. by the kindred Khazars. Under their king, Arpad, the united Hunagar-Magyar nation obtained a permanent footing in Pannonia before the close of the 9th century. The bulk of the population have regular features, shapely figures, black hair and eyes, dark complexion, medium stature, quick, impulsive temperament, and intense patriotic feeling. The Magyar language is steadily encroaching on all the surrounding German, Slav, and Roumanian languages, the people of Magyar speech having increased from 8,436,000 in 1890 to 9,954,000 in 1900. See Vambéry, 'On the Origin of the Magyars,' in *Mitt. d. K. K. Geograph. Ges.* (1897).

Mahabaleshwar, a ridge of the W. Ghats, about 70 m. S.E. of Bombay, having an average altitude of 4,500 ft.; is the hot-weather resort of the governor of Bombay. The sanatorium was established in 1828. The village is of great sanctity in the eyes of Hindus, as the spot where the sacred Krishna has its source. Its average rainfall is 240 inches.

Mahabalipur, vil., Chengalpat dist., Madras, India, 35 m. S. of Madras; has famous cave temples and rock sculptures.

Mahābhārata, a sacred book of the Hindus, and probably the longest epic of the world; marks the period when Brahmanism, compelled to abandon its attitude of haughty isolation and to recognize the existence of thoughts

and aspirations other than its own, held out its hands to folklore, demonology, and hero-worship. Its authorship is ascribed to supernatural agency; but its redaction remains loose, fragmentary, and chaotic, and its story is smothered under didactic pronouncements, irrelevant digressions, vivid descriptions of scenery, relieved here and there by flashes of lofty moral sentiment. Two brothers of the Lunar dynasty establish rival thrones in Bharata (N. India). Dhritrashtra, the elder, has one hundred sons, commonly known as the Kurus, who represent the powers of evil. The powers of good are represented by Pandu, the younger brother's five sons, who have a common wife, Draupadi, the Helen of the song. When the Pandu princes, in conflict with their foes, have lost all, they stake Draupadi, and, on the throw of the dice, she becomes the prize of their rivals. The god Krishna comes to the assistance of the outraged wife, and as her single garment is repeatedly torn from her body by the exultant Kurus, Krishna clothes her with innumerable celestial robes. The wanderings and trials of the Pandus signify the temporary triumph of vice, until the victory of virtue is crowned by the renunciation by the Pandus of an earthly throne for a heavenly kingdom. A new edition, comprising Sanskrit text, with complete English and Hindi translations, was begun at Moradabad in 1902. There is an English prose translation by Protap Chandra Roy (1883, etc.).

Mahadev Govind Ranade (1842-1901), Hindu lawyer and social reformer, born at Niphad in Bombay. In 1866 he became a translator in the government service, subsequently (1868) prime minister of Kolhapur state, and from 1871 held various high judicial offices. As a social reformer he was particularly prominent in the agitation for allowing Hindu widows to remarry, and in educational movements.

Mahadeva. See **SIVA**.

Mahaffy, **JOHN PENTLAND** (1839), Irish historian, and for many years professor of ancient history at Dublin University, born near Vevey, Switzerland. He has published *Twelve L. tures on Primitive Civilization* (1868); *Greek Social Life from Homer to Menander* (1874); *Greek Antiquities* (1876); *Greek Life and Thought from Alexander to the Roman Conquest* (1887); *Empire of the Ptolemies* (1896); *The Art of Conversation* (1889); and *An Epoch in Irish History* (1904). He edited an English edition of *Duruy's Roman History* (1883-6).

Mahan, ALFRED THAYER (1840), American naval writer, was born at West Point, New York. His writings on naval history, traditions, and power have won him world-wide recognition as a master-mind on maritime questions. His principal work is *The Influence of Sea-Power upon History, 1660-1783* (1890). Subsequent works have been *The Life of Nelson* (1897), *Lessons on the War with Spain* (1899), *Short History of the South African War* (1900), *The Problem of Asia* (1900), *Retrospect and Prospect* (1902), *Types of Naval Officers* (1902), and *Sea Power in its Relation to the War of 1812* (1905).

Mahanadi, or MAHANUDDY, riv., India, rises 25 m. S. of Raipur, in Central Provinces, and after a course of 520 m. falls into the Bay of Bengal by several mouths, about 120 m. S.W. of the Ganges delta. Area of catchment basin, 52,500 sq. m.

Mahanaim (Gen. 32:2, etc.), tn. in Gilead, Palestine, stood apparently towards the S. (1 Kings 4:14). Jacob, having travelled along the plateau from Mizpeh, in N. Gilead, to Mahanaim, recrossed the Jabbok, retreating north before Esau, and descending to Succoth in the Jordan valley, N. of the river.

Mahanyo City, bor., Schuylkill co., Pennsylvania, U.S.A.; is in the anthracite coal region, 90 m. N.W. of Philadelphia. Pop. (1900) 13,504.

Maharajah. See RAJA.

Maharajagar, tn. in native state of Charakhari, Bundelkhand, Central India. Pop. (1901) 11,718.

Mahavansa, two books written in Pali, which purport to give a historical account of the island of Ceylon previous to the 4th century. Portions were translated by George Turnour in 1837.

Mahavira, the last of the twenty-four *Arhat* (Jain teachers) of the present age. Originally a deity, Mahavira is said to have voluntarily submitted to successive incarnations, in all of which he succeeded in winning immortality. His holy life enabled him to work miracles.

Mahdi, the expected Messiah of the Mohammedans. A Persian Shia named Abdulla, who lived about the 10th century, and whose preaching was greatly influenced by the doctrines of Zoroaster, was the first to proclaim the advent of a future Moslem teacher greater than Mohammed, who would lead the faithful to victory and conquer the world. This Messiah, it was declared, would never die; and though for a time he might disappear, at his second coming he would reconcile all differences among true believers. This dogma

of Mahdism was accepted by the sect, then called Ismailis, to which Abdulla belonged. From time to time Mohammedan fanatics have risen in Syria, Persia, Turkey, and Egypt, who, claiming to be the Mahdi, have attempted the prosecution of religious wars. The most modern of these Mahdis was Mohammed Ahmed (born at Dongola in 1843; died at Omdurman in 1885), who made repeated efforts to conquer the Sudan. See James Darmesteter's *The Mahdi, Past and Present* (1885).

Mahe, French settlement, Malabar dist., Madras, India, 33 m. N.W. of Calicut. Settled in 1722, it was taken by the British in 1761, and again in 1779, being restored to France in 1815. Area, 2 sq. m. Pop. (1902) 9,455.

Mahikantha, group of feudatory states under the political control of the government of Bombay, India. Area, 11,049 sq. m. Pop. (1901) 361,545.

Mahim, suburb of Bombay, India, on N.W. coast of Bombay I. Oysters are abundant. Pop. (1901) 5,699.

Mahmud I. (1696-1754) became Sultan of Turkey in 1730, and was involved during the whole of his reign in wars with Austria and Russia, who had conspired to partition his kingdom. He inflicted several defeats on the Austrians, and recovered Belgrade, but did not make much headway against the Russians. — **MAHMUD II.** (1785-1839) became Sultan in 1808. In 1826 he suppressed the famous Janissary troops, and reorganized the army on European lines. Nevertheless he was forced in 1829 to recognize the independence of Greece, but successfully repressed (1833) the revolt of Mehemet Ali in Egypt. He also made a strenuous attempt to reform the internal administration and finances of the empire.

Mahmud of Ghazni. See GHAZNI.

Mahogany, the wood of a West Indian and South American tree, *Swietenia mahagoni*, belonging to the order Cedrelaceæ. It was first brought to Britain a little over two centuries ago by Gibbons. When felled, mahogany is of a light reddish-brown colour, but it soon darkens on exposure to sunlight. The heartwood is heavy, hard, close and straight in grain, and takes a very high polish, with a characteristic lustre, and sometimes with a wavy figure. Cuba or Spanish mahogany is used as a substitute for oak in shipbuilding, for beams, planks, and stanchions, whilst figured logs demand high prices for furniture. St. Domingo mahogany is very similar in quality, very hard, almost horny, a stress of 4,300 lbs.

per sq. in. being required to indent it $\frac{3}{8}$ in. transversely to the fibres. It is mostly figured, presenting a rich curl or feather at the bases of its branches. It is entirely used for cabinet work, especially for veneers. Nassau mahogany is used in turnery. Honduras mahogany is seldom figured, becomes somewhat brittle on drying, and is apt to develop deep star-shakes. Stress required to indent it $\frac{3}{8}$ in. transversely to its fibres, 1,300 lbs. It is known commercially as 'baywood,' and besides being used as a substitute for oak in shipbuilding, is largely used in cabin fittings and by cabinetmakers, turners, and carpenters. Some mahogany sold as Honduras is really Guatemalan. Mexican mahogany reaches the largest dimensions, generally coming to market in logs from 18 to 30 ft. long, and from 15 to 36 in. square. It is generally somewhat soft and spongy at the centre, often affected by star-shake, and plain in figure. The wood of the Coromandel redwood, *Soymida febrifuga*, is sometimes called East Indian mahogany; that of *Eucalyptus botryoides*, bastard mahogany; of *Khaya senegalensis*, African mahogany; of *Eucalyptus resinifera*, forest or red mahogany; and of *Cercocarpus ledifolius*, bay mahogany.

Mahomet, Mahomedanism. See MOHAMMED, MOHAMMEDANISM.

Mahon Port. See PORT MAHON.

Mahony, FRANCIS SYLVESTER (1804-66), Irish humorist, known as Father Prout, was born at Cork. Settling in London as a man of letters, in 1834-6 he contributed to *Fraser's Magazine* his *Reliques of Father Prout*. As an original lyricist Mahony is on his highest level with the haunting if somewhat artificial *Bells of Shandon*. His most elaborate prose — the *Apology for Lent*, *Dean Swift's Madness*, *Literature of the Jesuits* — is brilliantly allusive and energetic in style, but suffers from temperamental extravagance of humour and argumentative whim. In 1837-42 further papers of the Prout type were written (mainly from the Continent) for *Bentley's Miscellany*. About 1848 he made Paris his headquarters, and after 1858 was Paris correspondent for the *Globe*. In 1860 he wrote a characteristic inaugural ode for the first number of *Cornhill*. The *Reliques of Father Prout* appeared in 2 vols. in 1836, and again in 1860. In 1881 Mr. Charles Kent edited *The Works of Father Prout*, with memoir.

Mahrattas. See MARATHA.

Mährisch-Ostrau. See OSTRAU-MÄHRISCH.

Mahurea, a genus of South American evergreen trees belonging to the order Ternstroemiaceae, bearing terminal panicles of pinkish or purplish flowers. *M. palustris*, which flowers in May, is the only species cultivated. It requires a peaty soil and stove heat.

Mahuwa, tn. and port, Bhavnagar state, Kathiawar peninsula, Bombay, India, 55 m. N.E. of Diu. Pop. (1901) 17,549.

Mai, ANGELO (1782-1854), Italian classical scholar, born at Schilpario (Bergamo). Appointed (1813) keeper of the Ambrosian library at Milan, he was successful in bringing to light lost writings of Cicero, Cornelius Fronto, and Plautus. In 1819 he was appointed librarian of the Vatican, in 1833 secretary of the Propaganda, and received the cardinal's hat in 1838.

Maia, in ancient Greek mythology, the eldest of the Pleiads, and by Zeus the mother of Hermes.

Maiden, a species of guillotine constructed at Edinburgh in 1664-65, and used from that date onward till 1710.

Maidenhair Fern. See ADIANTUM.

Maidenhair Tree. See GINKGO.

Maidenhead, munic. bor. and mkt. tn., Berkshire, England, on the Thames, 13 m. E. of Reading. A bridge (1772) crosses the Thames to Taplow. Remains of a Roman villa have been excavated. Pop. (1901) 12,980.

Maidment, JAMES (1795-1879), Scottish antiquary, born in London. He edited numerous historical documents, mainly relating to Scottish affairs. He was chief editor of Kay's *Edinburgh Portraits* (2 vols. 1837), and collaborated with W. H. Logan in *Dramatists of the Restoration* (14 vols. 1877), *The Spottiswoode Miscellany* (2 vols. 1844-5), and *Scottish Ballads and Songs* (1859). See *Bibliography*, by T. G. Stevenson (1883).

Maid of Honour are, in the English court, attached to the Queen's household in the department of the mistress of the robes. To them is assigned the duty, in turn, of daily attendance upon the Queen. In the official Table of Precedence maids of honour rank after the daughters of barons, and before the wives of Knights of the Garter. They are entitled to the prefix 'Honourable.' Queen Victoria had eight maids of honour, but Queen Alexandra has only four.

Maidstone, munic. and parl. bor., Kent, England, 34 m. by rail E.S.E. of London, and on the Medway. The church of All Saints dates from the 14th century, and was attached to the college of All Saints, founded

by Archbishop Courtenay. An archiepiscopal palace was also erected by Courtenay; the present building, chiefly Elizabethan, was acquired by the town council in 1887. The grammar school was founded in 1547. The Charles Museum was opened in 1858, in the Chilington manor house. The county lunatic asylum is on Barming Heath. Industries include paper mills, breweries, malt kilns, and agricultural implement works. Stone is quarried, and hops and fruit are grown. The town was taken by Fairfax in 1648. It returns one member to the House of Commons. Pop. (1901) 33,516.

Maikop, fort. tn., N. Caucasus, Russia, 60 m. S.E. of Ekaterinodar. Pop. (1897) 34,191.

Maidun, a romantic character in ancient Irish lore, who, born in Co. Clare, and of the kindred of Owenaght, saw many wonderful things and performed many wonderful feats whilst tracking the murderer of his father. His exploits are detailed by Joyce in *Ancient Celtic Romances* (1879).

Maimachin, Mongolian tn. and Chinese frontier post, opposite Kiakhta, in 50° 15' N. lat. The town has two fine temples. It trades in tea, silk, porcelain, paper, furs, and metal articles. There are hardly any permanent inhabitants, and women are forbidden to enter the town.

Maimansingh, dist., Dacca div., Bengal, India. Area, 6,287 sq. m.; pop. (1901) 3,915,068. Cap. Nasirabad.

Maimbourg, LOUIS (1610-86), French priest, born at Nancy; author of *Traité historique des Prerogatives de l'Eglise de Rome* (1685; Eng. ed. 1685), *Histoire de la Décadence de l'Empire après Charlemagne* (1681), and *Histoire des Croisades* (1682). He was expelled from the Jesuit order because of his Gallican views. His *Schriften* were published in 14 vols. (1686-7).

Maimon, SOLOMON (1754-1800), Jewish philosopher, was born near Mir in Lithuania; went to Berlin, and became a friend of Mendelssohn; was admired by Kant, and attracted the notice of Goethe. In his *Versuch über die Transcendentalphilosophie* (1790) he endeavoured to improve upon Kant; he also wrote *Versuch einer neuen Logik* (1794). See his very interesting *Autobiography* (Eng. trans. 1888).

Maimonides, MOSES BEN MAIMON (1135-1204), Jewish philosopher and physician, styled by the Jews Rambam, was born at Cordova in Spain, where he was forced to embrace Islam. In Cairo he became physician to the sultan of Egypt. He was a pupil and friend of Averroes,

and wrote in Hebrew and Arabic, winning fame as a theologian, and was learned also in mathematics and astronomy. His chief works are *Mishneh Torah*, a systematic codification of Jewish Biblical law; *Mishnah*, a commentary; *An Abridgment of the 16th Book of Galen*; and (best known) *Moreh Nebokhim* (Eng. trans. as *Guide of the Perplexed*, by M. Friedländer, 1886), a philosophic explanation of difficult passages of Scripture.

Main, riv., formed in N.E. Bavaria, Germany, by the junction near Kulmbach of the White Main and the Red Main. After a very tortuous course of 307 m., mainly westerly, past Bamberg, Schweinfurt, Würzburg, Hanau, Offenbach, and Frankfurt, it joins the Rhine on the r. bk. opposite Mainz. It is navigable as far as Bamberg, but is canalized between Mainz and Frankfurt for the passage of larger vessels. Ludwig's Canal connects the Main with the Danube. The chief tributaries are the Regnitz and Tauber on the l. bk., and the Franconian Saale on the r. bk.

Maine. (1.) The north-easternmost state of the U.S.A., has an area of 29,900 sq. m. Originally a part of Massachusetts, it was admitted to the union as a state in 1820. The coast is extremely broken and rocky, with many headlands and deep bays, and thousands of islands. The surface is hilly, rising in Mt. Katahdin to 5,385 ft. Lakes and ponds are numerous—a result of erosion by the Laurentian glacier. Settlement is confined mainly to the S.W. the N. two-thirds being forest. The industries are slowly undergoing a change from agriculture to manufactures. Fine granite is quarried. The principal articles of manufacture are cotton cloth, woollen goods, and wood pulp. Lumbering and ice-cutting are active industries. Fishing thrives, especially for mackerel, cod, and herrings. The principal seaport is Portland; the capital is Augusta. The population in 1900 was 694,466. (2.) Ancient prov. of France, lay S. of Normandy and E. of Brittany, and corresponded roughly with departments Mayenne and Sarthe. The capital was Le Mans.

Maine, SIR HENRY JAMES SUMNER (1822-88), Scottish jurist and administrator, was born at Kelso. In 1847 he was appointed regius professor of civil law at Cambridge; but he soon migrated to London, and in 1852 was appointed reader in Roman law and jurisprudence in the Inns of Court. His great work on *Ancient Law* appeared in 1861. He was legal member of the Council of India (1862-9). After his return he was appointed corpus professor

of jurisprudence at Oxford, and wrote *Village Communities in the East and West* (1871), *The Early History of Institutions* (1875), and *Early Law and Custom* (1883). In 1871 he became a member of the Council of the Secretary of State for India, in 1877 he was elected to the headship of Trinity Hall, Cambridge, and in 1887 to the Whewell professorship of inter-

Maine-et-Loire, N.W. dep. of France, formed from ancient Anjou. It is 2,812 sq. m. in area, consists mainly of low hills and plains, and is traversed from E. to W. by the navigable Loire, which is joined on the r. bk. by the Maine. The soil is generally fertile, especially in the Loire valley. Flax, hemp, and the vine are cultivated (the last especially

be direct descendants of the ancient Spartans. They number over 40,000.

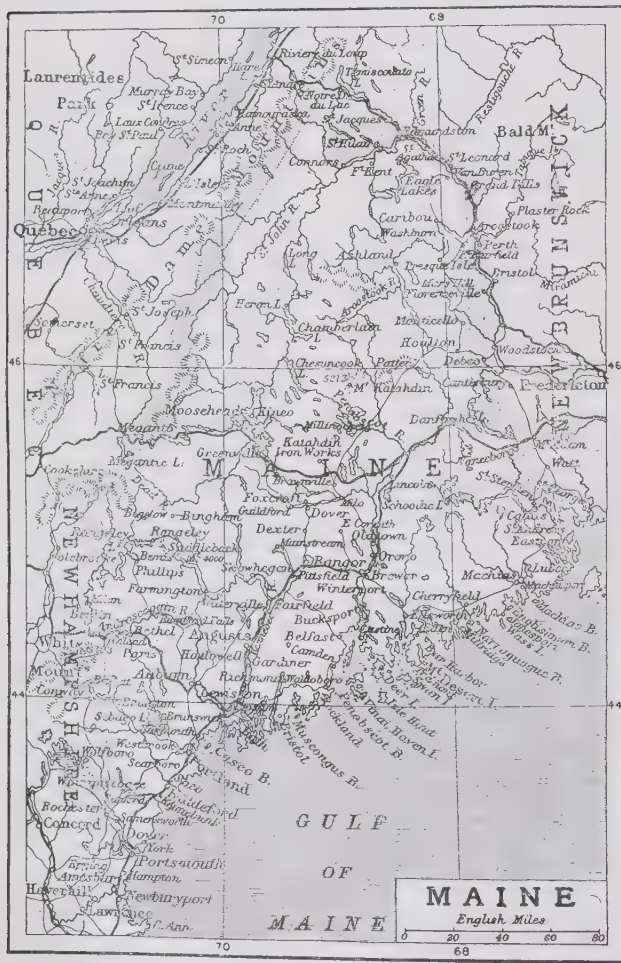
Mainpuri, cap. dist. of same name, United Provinces, India, 83 m. S.W. of Bareilly. Pop. (1901) 19,000.

Maintenance is the offence of maintaining a party in litigation in which the offender is not personally interested. It generally consists in providing money. A contract for maintenance is void, and the offence is punishable by fine and imprisonment, and is a cause of action for damages. The best-known modern case is *Bradlaugh v. Newdigate* (L.R., 11 Q.B.D. 1). See also **CHAMPERTY**.

Maintenance, CAP OF, in heraldry, a symbol of dignity at first confined to the arms of princes and dukes, but at a comparatively early period used by other branches of the nobility. In the achievement it is usually placed to support the crest. The cap is usually depicted as of blue or scarlet velvet turned up with ermine or some other fur, with the two points of the cap turned to the sinister.

Maintenon, FRANÇOISE D'AUBIGNE, MADAME DE (1635-1719), second wife of Louis XIV. Saved from scandal by her marriage with Scarron, poet and wit (1652), she met as his wife all literary Paris. On his death (1660), helped by Anne of Austria she passed through a period of poverty, till installed by Madame de Montespan as governess of her children by Louis XIV. Wholly successful in winning the affection and respect both of the children and their father, she was made Marquise de Maintenon (1673), and after the death of the queen (1683) was married secretly to Louis, probably in December 1684. Her influence coincides with the unfortunate half of Louis's reign (1685-1715), when persecution was rife. She found her greatest pleasure in the school of St. Cyr, which she founded for three hundred poor girls. Her *Lettres*, ed. Lavallée (12 vols. 1854), are accounted amongst the best French prose works of the 17th century.

Mainz (Fr. *Mayence*), fort. tn., grand-duchy of Hesse, Germany, on l. bk. of Rhine, opposite the mouth of the river Main. It is one of the most important commercial centres on the Rhine, and carries on a brisk shipping trade with Holland and Belgium. Its principal exports are leather goods, furniture, and wine, while lithographic and other printing are flourishing industries. Gutenberg, the inventor of movable type for printing, was born here. The picturesque cathedral dates back to 978. The old castle of



national law. His *International Law* was not published until after his death. His political book, *Popular Government* (1885), is not in his happiest vein. See *Sir Henry Maine* (1892), by Grant Duff; *Theories and Criticisms of Sir Henry Maine*, by M. O. Evans (1896); and *Oxford Lectures and other Discourses* (1890), by Sir F. Pollock.

round Saumur). Coal is mined in the Loire valley, and slate is quarried round Angers. Cotton, woollen, and linen goods are manufactured. Cap. Angers. Pop. (1901) 514,658.

Mainland. See POMONA.

Mainotes, the inhabitants of the central districts of the Peloponnese in Greece, now called Mani or Maina. They claim to

the electors, built in 1627-78, contains rich collections of Roman and Germanic antiquities, and the Gutenbergmuseum, established in 1901. Mainz was founded by Drusus, 13 B.C., as *Maguntiacum*. The town's political importance dates from 747, when it was made an archbishopric. Mainz was ceded to France in 1801 by the peace of Lunéville, but was retaken in 1814 and incorporated with the grand-duchy of Hesse in 1816. It is connected by a bridge with the strongly fortified town of Kastel (the Castellum Mattiacorum of the Romans), on the r. bk. of the Rhine. Pop. (1900) 84,251.

Măiorescu, Titu (1840), Roumanian statesman and author, was born at Craiova, and became (1862) professor of philosophy, first at Jassy and afterwards at Bucharest. He has exercised an epoch-making influence on recent Roumanian literature, both personally and by his essays—*Critice* (2 vols. 1892). He is an eloquent speaker, and has several times (1874-6, 1888-9, etc.) been minister of public instruction, when he endeavoured to organize education in Roumania on the Prussian plan.

Mairia, a genus of S. African herbaceous plants belonging to the order Composite, bearing rather large pink and yellow flower-heads. *M. crenata*, which flowers in the spring, is the only species cultivated. It requires a peaty soil, plenty of moisture, and a greenhouse temperature.

Maistre, Joseph Marie, Comte de (1754-1821), diplomatist and philosophical writer, born at Chambéry, Savoy. Following the conquest of Savoy by the French, he quitted the country for Sardinia, and subsequently went to Turin, and thence to St. Petersburg as ambassador (1803). In 1817 he returned to Turin, and died there. De Maistre occupied a prominent position in his day as a philosophical writer. All his works are tinged with high political considerations, involving complete papal supremacy and the adoption of the principles and tenets of theocracy. Author of *Considérations sur la France* (1796), *Essai sur le Principe Générateur des Constitutions Politiques* (1810), *Du Pape* (1819), *De l'Eglise Gallicane* (1821), and other treatises. Consult *Critical Miscellanies* (3 vols. 1886), by John Morley.

Maistre, Xavier de (1763-1852), soldier and littérateur, born at Chambéry, Savoy, brother of Joseph de Maistre. When the French subdued Savoy he went to St. Petersburg, and died in that capital. His literary conceptions include *Voyage autour*

de my Chambre (1794), a work of striking originality, which had a sequel in the *Expédition Nocturne autour de ma Chambre* (1825), *Lépreux de la Cité d'Aoste* (1817), *La Jeune Sibérienne* (1815), and *Les Prisonniers du Caucase* (1815). An edition of his collected works was issued in 1881.

Maitland. (1.) EAST, town of N.S.W., Australia, 120 m. N. of Sydney, and on Hunter R. Vine and maize growing are carried on, and there are collieries. Pop. (1901) 3,287. (2.) M. WEST is much the larger place. Pop. 6,798.

Maitland, Scottish family of Anglo-Norman origin, of whom the earliest known in Scotland was Thomas Maitland, who obtained lands in Berwickshire from William the Lion. The popular hero referred to in Gawain Douglas's *Palice of Honour*, and whose deeds were celebrated in popular song, has not been definitely identified. The ancient seat of the family was Thirlestane, Berwickshire, and in the 14th century they came into the possession of Lethington, East Lothian.

—SIR RICHARD MAITLAND, LORD LETHINGTON (1496-1586), was in November 1561 named an ordinary lord of session, and in December 1562 keeper of the great seal. The latter office he held until 1567, and the former until 1584. He made a famous collection of Scottish poetry, a complete edition of which is now in preparation by the Scottish Text Society. His own verses, chiefly satirical pieces, were printed by the Maitland Club in 1830. His *History of the House of Seaton* appeared in the same year.—His eldest son, WILLIAM MAITLAND (?1528-73), known as Secretary Lethington, entered the service of the queen-regent, who employed him on diplomatic missions. But joining the Lords in 1559, he had much to do with the supremacy of Protestantism in Scotland. When Mary Stuart returned to Scotland, Maitland was retained as one of her chief political advisers, holding the office of secretary. To reconcile Mary to Protestantism he did all that he could to bridle the pretensions of Knox. When Bothwell won the ascendancy over Mary, Maitland again joined the Lords, who shortly afterwards sent Mary to Loch Leven. It is, therefore, difficult to believe that Maitland had any hand in the concoction—if they were concocted—of the casket letters that were used against Mary. On the failure of the Norfolk marriage scheme, which he endeavoured to promote, he definitely separated himself from Mary's opponents. This led to his being formally accused of connection with the Darnley

murder; but having been rescued by Kirkaldy of Grange and lodged in the castle of Edinburgh, he was by the nobles 'purged of privitie to the murder of the king or regent,' and set at liberty. After a vain attempt to reconcile the two factions, he, on April 1, 1571, joined Kirkaldy of Grange, who was holding Edinburgh Castle for the queen. On its capture he was sentenced to execution, but died while in prison in Leith.—His brother, SIR JOHN MAITLAND, LORD MAITLAND OF THIRLESTANE (?1545-93), became lord high chancellor of Scotland. In 1567 he was made lord privy seal, and in 1568 a spiritual lord of session. Being with his brother in Edinburgh Castle on its surrender, he was sent a prisoner to Tantallon, and did not obtain full liberty until Morton's resignation of the regency in 1578. He took an active part in Morton's final overthrow, and after Morton's execution in 1581 won the confidence of the king, and exercised a supreme influence in the king's counsels. In 1587 he was made lord high chancellor. Some of his Latin verses are included in *Delicite Poetarum Scotorum* (1637). His son John became first Earl of Lauderdale, and was father of John, second earl and first duke. (See LAUDERDALE.) See Skelton's *Maitland of Lethington* (1887-8).

Maitland, Sir Frederick Lewis (1777-1839), British admiral, was born at Rankielour, Fifeshire; took part in Lord Howe's victory of the first of June 1794, and was employed in the Egyptian expedition of 1801. In 1815, when in command of the *Bellerophon*, he received the surrender of Bonaparte. See his *Surrender of Napoleon* (1904).

Maiwand, place, 35 m. W. of Kandahar, Afghanistan, was the scene of the defeat of the British under Burrows by Ayub Khan on July 27, 1880.

Maize, or INDIAN CORN (*Zea mays*), is a true grass, and is only known in the cultivated state. It is indigenous in tropical America, and has been cultivated for ages in Asiatic islands under the equator, from whence it passed northward to China and westward to India and Turkey. Large supplies come to Britain from the Danubian provinces, but the principal supply is from N. America. It can be successfully grown in the south of England as a fodder crop, and is very suitable for ensilage. The plant grows to a height of 11 ft. It is monoecious, producing beautifully tasselled male flowers; and the female flowers, which develop the 'cobs,' are found closely applied to the central axils of the leaves below. The grain is somewhat

deficient in albuminoids, but is rich in carbohydrates, such as starch and fats. The meal is harsh, and does not mix freely with water, and for this reason is less popular than barley-meal for pig-fattening. It is not suitable for bread-making, but when deprived of its gluten is the basis of oswego or corn flour. The green cob is a delicacy, and the ripened grains of the harder varieties 'pop' or burst when roasted, and the inside swells up, and is of agreeable flavour.



Maize.

1. Ripe head, or cob; 2, earlier stage, with 'silk'; 3, single female flower; 4, male flower; 5, part of male spike; 6, seed.

Maize Beer is used in many parts of S. America. The native women chew maize, and eject the mass into a large calabash. It is then diluted with water and allowed to ferment spontaneously. This beverage produces powerful effects on those who indulge in it.

Majestic, a British first-class battleship (14,900 tons), launched

in 1895. Since 1783 there have been British men-of-war of this name.

Majesty. See SOVEREIGNTY.

Majolica, a term applied by Italian potters originally to enamelled and lusted ware, though now it includes also enamelled ware that is not lusted. The enamel is specifically tin dioxide. Tradition says that this type of pottery was introduced into Italy by the Pisans from the island of Majorca in the 12th century. They had, however, made enamelled pottery long before that; but in the 15th century they appear to have learned, or discovered independently, the secret of the lustre of tin enamel. The classic period of the specifically Italian majolica covers the 15th and 16th centuries; the principal seats of its manufacture were Forlì, Faenza, Pesaro, Urbino, Gubbio, and Castel Durante; and amongst the more famous masters of the art were Giorgio Andreoli (work dated 1517-37) of Gubbio, and F. X. Avelli, Guido Fontana, and Niccolò da Urbino, at Urbino and Castel Durante. Much of this ware was highly decorated and painted in blue, ruby, yellow, silver, gold, and other colours, which were put on sometimes before, sometimes after, the firing. The white enamel was composed of thirty parts of powdered glass mixed with twelve parts of tin dioxide. Majolica continued to be made in Italy during the 17th and 18th centuries, and the classic types are cleverly produced at the present day. The term *mezzamajolica* was used by early Italian writers to mean ware that was covered with a white clay 'slip' instead of the tin enamel. See Falke's *Majolica* (1896), Drury and Fortnum's *Majolica* (1896), and Vanzolini's *Istoria delle Fabbriche di Majoliche* (1879).

Major, a military rank, next in degree above that of captain and below that of lieutenant-colonel. Formerly every cavalry regiment and battalion of infantry had two majors; but the rank was suppressed in the artillery and engineers for a long period. In 1881 Mr. Childers gave every cavalry regiment and infantry battalion four majors; but of these one is second in command of the unit, and practically of higher position than the other three, who command companies as captains, and are majors in little more than name. In the Royal Horse and Royal Field Artillery the major is the commanding officer of a battery; in the Royal Garrison Artillery and Royal Engineers majors command the companies. In all other European armies where this rank exists it applies to the officer

commanding a battalion or corresponding body.

Major, or MAIR, JOHN (c. 1470-1550), Scottish historian and divine, was born at Gleghornie, E. Lothian. He taught, after 1496, at the Sorbonne and Montaigu colleges in Paris, returning (1518) to Scotland as professor at Glasgow University, where John Knox and Patrick Hamilton were his pupils. He removed (1522) to St. Andrews, followed by George Buchanan, also a pupil. He was again at Paris, as 'chief of the scholastic philosophy' (1525-31); and when he returned to St. Andrews, was provost of St. Salvador's College till his death. His most important work, a *History of Greater Britain* (1521), a critical narrative, has been done into English by the Scottish History Society, and contains his biography (1892).

Majorca (Sp. *Mallorca*), largest of the Balearic Is., in the Mediterranean, 115 m. S.S.E. by S. of Barcelona; measures 60 m. by 45 m. Area, 1,310 sq. m. The soil is very rich, and produces subtropical products. The country is hilly. The climate is oppressive and relaxing during most of the year, owing to the great dampness of the air; but the island is fairly healthy, especially since the drainage by an English company of the great Albufera morass at Alcudia in the N. (1864-70). The race is much mixed, with Greek, Celtic, Carthaginian, and Provençal strains, and there are many Celtic remains. The Moorish kingdom of Mallorca was conquered by Jaime of Aragon (1282), and in 1343 incorporated in Aragon. Pop. (1900) 248,194.

Majority. At the age of twenty-one, according to the law of both England and Scotland, a person attains his or her majority and becomes *sui juris*, or of full legal capacity. As the law takes no account of a fraction of a day, a person attains his majority on the day before the twenty-first anniversary of his birth. (See INFANTS, MINOR, and PUPIL.) The right of a majority to bind a minority exists only by custom, statute, or agreement; by custom in the case of public assemblies and courts of justice; by statute in the case of creditors under the Bankruptcy Acts; and by agreement expressed in articles, or some constitutive document in the case of partnerships, companies, bodies of trustees, etc.

Majuba Hill, height of the Drakenberg range, N.W. Natal, British S. Africa; is noted for the defeat of the British by the Boers on Feb. 27, 1881, General Sir George Colley being killed in the action.

Majunga, or **MOJANGA**, chief port on N.W. coast of Madagascar, on N. side of Bay of Bombetoke. The trade in 1904 was valued at over £300,000. Pop. 6,000.

Makalla, or **MOKALLA**, seaport, Arabia, 300 m. N.E. of Aden, is the chief port of Hadramaut. Pop. 18,000.

Makaroff, S. O. (1849-1904), Russian admiral, was born at Nicolaieff. During the Russo-Turkish war of 1877 he torpedoed

Makart, **HANS** (1840-84), Austrian painter, was born at Salzburg; was a pupil of Piloty at Munich (1861-5). He first won fame by *Amorettes* and *The Seven Deadly Sins* (1868), in which his love for gigantic dimensions and gorgeous colour effects finds full expression. In 1869 he settled at Vienna, and in 1879 was made professor at the art academy there. His other principal works include *The Homage of Venice to*

Moors in Spain. These took shape as his *Histoire Générale des Arabes d'Espagne* (1855-61; Eng. trans., in part, 1840-3).

Mako, tn., Csanád co., Hungary, on r. bk. of river Maros, 19 m. E. of Szegedin; has a fine episcopal palace. Pop. (1900) 33,701.

Makololos, South African people of mixed Bechuana stock, who moved to the Zambezi about 1835. Here they overthrew the Barotse nation; but in 1870 the Barotse rose against them, and exterminated them to a man, except a few chiefs, then absent.

Makrizi, **TAKI-ED-DIN AHMED EL-** (c. 1364-1441), Arabic historian, born at Cairo, and famous for a *History and Topographical Description of Egypt*, of which a French translation appeared in 1895. He also wrote, or rather compiled, histories of the Fatimites, and of the Ayyubid and Mameluke sovereigns of Egypt (French trans. 1837-44), and an encyclopædia of Egyptian biographies.

Malabar, maritime dist. of S.W. Madras, India, stretching for 145 m. along the coast, and extending inland to the W. Ghats, but also including the town of Cochin. There are extensive forests. Rice, coffee, pepper, and cocoanuts are other important products. Area, 5,585 sq. m. Pop. (1901) 487,484.

Malabari, **BEHRAMJI MERWANJI** (1853), Indian author and reformer, born at Baroda; identified with movements for the intellectual advance of India, and a strong advocate for the reform or abolition of various social abuses and customs, such as infant marriage and the remarriage of Hindu widows. He is the author of *The Indian Eye on English Life* (1891). His *Life* was written by Menant (1898).

Malacca, colony and tn., Malay Peninsula, and the largest of the Straits Settlements. Area, 660 sq. m. (1.) The colony consists of a strip, 40 m. long by 25 m. broad, along the coast. The country is formed of undulating hills of moderate elevation, behind which rises Mt. Ophir, or Gunong Ledang (3,840 ft.). The coast lands are generally low and swampy, but are well timbered. The rainfall is heavy. Imports (1904), £4,087,019 (including bullion and specie), and exports, £3,357,474. Pop. (1901), consisting chiefly of Malays and Chinese, 95,487. (2.) Town, on Strait of Malacca, 2° 11' N. In 1511 it fell into the hands of the Portuguese, from whom it was taken by the Dutch in 1641. In 1825 it was exchanged with the British for Bencoolen in Sumatra. Malacca is a free port. Here are an Anglo-Chinese college and a govern-



Majolica Vase by Maestro Giorgio di Gubbio.

several Turkish warships. In 1894 he was appointed commander of the Baltic fleet, in 1898 commander-in-chief of the Cronstadt naval station, and in February 1904 he was given the sole command of the Russian fleet in the Far East. He perished in the destruction by a mine of his flagship, the *Petropavlovsk*, two months later. Makaroff designed the ice-breaker *Yermak* and the collision-mat used in all navies. He was also the author of works on naval tactics.

Catherine Cornaro (1873), *Cleopatra on the Nile*, *Entrance of Charles V. into Antwerp* (1878), *The Death of Cleopatra*, and *The Spring*. He had a fondness for sensuous but lifeless human forms, and for faded leaves and flowers. See *Life*, in German, by Von Lützwow (1886).

Makkari, **ABU'L ABBAS AHMED EL-** (c. 1585-1631), Arabic chronicler, born at Tlemçen, Algeria. He lived at Fez and at Cairo, and lectured at Damascus on the conquests and achievements of the

ment hospital. The chief exports are tin, rice, tapioca, pepper, nutmegs, mace, sago, buffalo hides and horns, rattans, gutta-percha, gum, coffee, and opium. (3.) STRAIT OF, the channel separating the Malay Peninsula from Sumatra and the adjacent islands. It is about 550 m. long, and varies in width from 185 m. in the N. to 35 m. in the S. Both shores of the strait are fringed with shallow mud-banks.

Malachi, the last of the books of the Old Testament, and in the Hebrew canon the last of the twelve minor prophets. It contains denunciations upon priests and people for their polluted sacrifices, their mixed marriages, their neglect of tithes and offerings, and their pride; and it likewise pronounces the threat of penalty, and the promise of the Messiah, who is to be preceded by a divine messenger (Elijah). The writer lived after the return from the captivity, and was probably contemporary with Ezra and Nehemiah (c. 460 B.C. and later). There has been much discussion among scholars as to whether Malachi was the proper name of the prophet (Hitzig, Vatke, Orelli, Robertson) or a general name prefixed to an anonymous work and (probably) borrowed from 3:1 (Ewald, Kuenen, Wellhausen, Robertson Smith, G. A. Smith). The style shows a considerable decadence from the pathos and grandeur of the great prophetic age; but in its play of question and answer the book reveals no small dramatic power, and it has enriched Christian literature with a relatively large number of memorable utterances (cf. 1:2, 3, 11; 3:1 f., 8, 17; 4:2, etc.). See Commentaries by Köhler (1865), Pusey (1877), Nowack (1897), G. A. Smith (*Expos. Bible*, 1898), Perovue (*Camb. Bible*).

Malachite, basic carbonate of copper, $\text{CuCO}_3\text{Cu}(\text{OH})_2$, is of wide distribution, but occurs chiefly in the Urals, in nodular or mamillated masses of stalagmitic origin. It is of emerald-green colour, and somewhat soft (h. = 3.5, sp. gr. about 3.9). Malachite is of value as a source of copper, but is chiefly used for ornamental purposes, on account of the beautiful colour and markings brought out by polishing.

Malachite Green, or BENZALDEHYDE GREEN, $\text{C}_6\text{H}_5\text{COH}(\text{C}_6\text{H}_4\text{N}(\text{CH}_3)_2)_2$, is a compound derived from triphenyl-methane, and obtained by heating benzaldehyde (oil of bitter almonds) with dimethyl-aniline and zinc chloride, followed by oxidation. It is itself colourless, but it loses water and forms bright green salts. The double salt with zinc chloride is used as a brilliant but somewhat fugitive green dye.

Malachy, St. (1094–1148), archbishop of Armagh, associated himself with Malchus, bishop of Lismore, and afterwards became head of the abbey of Bangor, Co. Down, and bishop of Connor (1124). As archbishop (1132–6) he effected great reforms, and was appointed papal legate by Innocent II. He died at Clairvaux, on his way to Rome. His friend St. Bernard wrote his *Life*, which is extant.

Malacology. See MOLLUSCA.

Malacopterygii, a name given by Cuvier to 'soft-finned' bony fishes—i.e. to those in which the dorsal fin is supported by soft rays instead of spines. The word is still used as an adjective to describe this condition, but no longer gives its name to a subdivision.

Malacostraca, the higher Crustacea, as contrasted with the small, simple forms (Entomostraca). See CRUSTACEA.

Maladetta (Fr. *Monts Maudits*), group of granite peaks, wild and precipitous, in Central Pyrenees, Spain, separating the valleys of Benasque and Aran. It contains Pic d'Anethou (11,170 ft.), the highest summit of the Pyrenees. It is best reached from Bagnères de Luchon.

Malaga. (1.) Mountainous prov., S. Spain, forming part of ancient kingdom of Granada, bordering on the Mediterranean. The climate is almost tropical in summer, and very mild in winter, the fertility and beauty of the province being unequalled even in Spain. Mining and agriculture are busy and progressive, and wine is produced. Area, 2,812 sq. m. Pop. (1900) 511,989. (2.) City, cap. of above prov., 82 m. S.S.E. of Cordova. It is a port on the Mediterranean, with export trade in fruits and wine, and cane-sugar and distilling industry. Of Phœnician origin, it was for centuries a Moorish city and one of the principal ports of the kingdom of Granada. Ferdinand the Catholic captured it, after a long siege, in 1487. The Moorish fortress (Alcazaba) has now disappeared. The town is straggling, but is picturesquely surrounded by gardens and vineyards, and almost enclosed by mountains. The cathedral is a vast structure, mainly Gothic. The climate in winter is beautifully mild, and favourable for invalids. Off the town was fought, on July 23, 1704, a naval battle between the Anglo-Dutch fleet and the Franco-Spanish fleet, the result being indecisive. Pop. (1900) 130,109.

Malaga, white Spanish wine, very full-bodied, luscious, and sweet; contains from 12 to 18 per cent. of alcohol by volume. It closely resembles Alicante.

Malakoff. (1.) Town, dep. Seine, France, S.W. suburb of Paris. At first it was known as California, but acquired its present name after 1848. Pop. (1901) 14,341. (2.) One of the chief defences of Sebastopol, Crimea. The French carried it by storm, Sept. 8, 1855, and its fall immediately preceded the evacuation of Sebastopol.

Malan, CÉSAR HENRI ABRAHAM (1787–1864), Swiss Protestant divine, born at Geneva, pastor of the state church there. He was the composer of the music of *Chants de Zion* (1826), and author of *The Church of Rome* (1844), *Pictures from Switzerland* (1852), *Stories for Children* (1852). See *Life* by his son, S. C. Malan (1869).



Malapterurus.

Malapterurus, the genus to which belongs the electric catfish, also called electric sheathfish. The most important species is *M. electricus*, which grows to a length of four feet, and is found in the Nile. The electric organ extends throughout the whole body. See ELECTRIC EEL, and CAT-FISH.

Mälär, lake of Sweden, 70 m. long, $\frac{1}{2}$ to 30 m. broad, with an area of 450 sq. m. Its surface is only from 1 to 2 ft. above sea-level. It flows into the Baltic through the city of Stockholm and the Södertelge Canal. The sea-water, however, often streams into the lake, the cause being probably a difference of atmospheric pressure on the lake and the sea respectively. It is studded with over a thousand islands. On them or its shores stand the royal palaces of Gripsholm, Ulriksdal, Drottningholm, and Haga. It is connected on the W. by the Arboga Canal with Lake Hjelmär.

Malaria, also AGUE, MIASMA, and INTERMITTENT FEVER, a specific infective disease, commonest in warm, marshy districts. It decreases in frequency generally in cultivated districts, as drainage improves; though near Rome, where eucalyptus trees were cultivated to combat malaria, they increased it. The cultivation of rice has also been stopped in certain places for the same reason. There are various types of malaria, the best known being the tertian (recurring every third day during the attack), the

quartan (every fourth day), the quotidian, the tropical or malignant (so called because of its locale and severity), and autumnal-estival, which tends to attack in spring and autumn. All, as far as is known, have like sources of infection—*viz.* the mosquito, of the species *Anopheles*, which carries the micro-organism of the malaria from the blood of one man to the blood of another.

Course of the Disease.—The period of incubation is not precisely known, but is believed to vary with the different types between two and fifteen days. The first symptoms resemble those of many fevers. There are languor, general discomfort, chilliness, and depression, with influenza-like pains in the limbs, back, and eyes. All these symptoms may come and go once or twice before the true attack begins. Then the chilliness becomes aggravated into a violent shivering fit, with chattering teeth, and possibly diarrhoea and vomiting, and ringing sounds in the ears. For half an hour or an hour no amount of external warmth or covering can make the sufferer feel warm, though his temperature is above normal all the time the paroxysm lasts, and may gradually go as high as 106° F. in an ordinary attack, much higher in the malignant type. Then comes a period during which the sufferer feels intensely hot, though possibly the body temperature is no higher, or only a degree more than during the chilly stage. This may last four or five hours, and then profuse sweating begins. With this there is a general improvement, the temperature falling, the pain disappearing, and sleep generally coming on. Another attack follows in twenty-four, forty-eight, or seventy-two hours, according to the type of malaria, and so on for some time, the attacks generally gradually lessening in severity, until they cease altogether; but in the malignant or tropical type exhaustion and death may be the end, generally due to extreme debility following several attacks. In other varieties, though death may result, it is much less common, and the chief result in ordinary cases is a long-continued anæmia, due to the destruction of red blood corpuscles by the specific organism of malaria which lives in them.

The victim to malaria has a characteristic appearance, due to the deterioration of the blood. He is sallow, wasted, languid, and with his muscular and mental strength much reduced. His spleen is the organ most affected. It is greatly enlarged, often to many times the normal size (ague-cake); and a frequent com-

plication in malaria is injury to the enlarged spleen through a slight blow, which may cause death by rupture and consequent hæmorrhage. There are various diseases with which malaria may be confused, particularly in the early stages and in the case of the malignant type. Influenza, typhoid fever, and abscess of the liver are perhaps the commonest. Microscopical examination of the blood will settle the matter. In case that be impossible, then if the sufferer does not rapidly improve under quinine and other appropriate treatment, the case is either not malaria, or it is not of the malignant type. The malignant form is characterized by its comparatively gradual onset, its failing to respond to quinine, and its fever gradually becoming remittent—*i.e.* practically constant, though lessened at intervals, instead of leaving the sufferer altogether at regular periods. The temperature in the malignant form tends to be very high. In fatal cases it may rise as far as 110° F., or even 112° F. Other grave complications are mania, paralysis, dysentery, or choleraic symptoms. Malaria so weakens the constitution as to make it common for other diseases to follow, and to be severe in their attacks.

Treatment.—It was long known that those exposed to night air in marshy districts were particularly liable to attacks of malaria; it was known, too, that swampy forests were dangerous in that respect even by day; but the disease was always attributed to foul gases, decomposing vegetable matter, and so forth. In 1847 Meckel of Vienna found that malaria was associated with black microscopic bodies in the blood; but he did not decide their nature or their influence. In 1880, Laveran, a French army surgeon, announced not only that malaria was a parasitic disease, but that the parasites could be seen as crescent-like bodies in the red blood corpuscles. Golgi, an Italian, showed that there was a difference, microscopically, between the parasites present in the blood in the different types of malaria—quartan and tertian—and also pointed out that the return of a high temperature coincided with the production of spores. Then Manson, in 1894, suggested that there existed a means of transference from one human being to another, and that the mosquito might serve that purpose. Nott had hazarded this suggestion as far back as 1848, and Laveran also thought it possible; but it was left to Ross of the Indian Medical Service to prove it; and Grassi, Bignani, and Manson all brought corroborative evidence.

It has now been proved by experiment that if mosquitoes are fed upon malaria patients, they can communicate malaria to those upon whom they feed later, the malaria being always of the same type—tertian, quartan, etc. Laboratory-bred mosquitoes, which have never been allowed to feed upon malaria patients, cannot inoculate any one with malaria. The microscope has given further evidence of the virtue of what has long been the universal remedy—*viz.* quinine. The microscope shows that this remedy prevents the young parasites from developing, though it does not seem to affect the mature ones; hence reproduction in time ceases in the human body. The microscope also shows that reproduction of the parasite in the human subject takes place by sporulation, though in the mosquito the parasite reproduces sexually. The microscope also shows that it is the female mosquito which carries the disease from one human host to another. When malaria is feared, about five grains of quinine are taken per diem, by the mouth. At the beginning of an attack ten or fifteen grains should be taken in a single dose, followed by five or ten every four hours. The dose is gradually lessened; but quinine must be taken for about a month after an attack. In the malignant type sporulation goes on in spite of quinine. When vomiting prevents the drug from being retained, it can be injected by the bowel, or by a vein, or intramuscularly. Roughly speaking, half doses are used intramuscularly and by a vein (the latter not generally recommended), while double doses are given by the bowel. In addition the sufferer is fed on light but nutritious food, is kept in bed between blankets, and encouraged to take copious hot drinks. Moreover, the breeding-places of mosquitoes—damp, warm spots—must be drained, or the pools where the mosquito larvæ develop must be made uninhabitable. This has been successfully accomplished in some instances by covering the water surface with paraffin, or some other fluid which excludes the air. At night mosquito-nets should be used, and various oily preparations may be smeared over exposed parts.

Malatia (anc. *Melitina*), tn., Asiatic Turkey, 90 m. N.W. of Diarbekir. Fruit culture is the chief industry; opium is also grown; and there are deposits of copper. It suffered considerably from an earthquake in 1893, and in 1895 was the scene of a massacre of 3,000 Armenians. Pop. 30,000.

Malayalam. See TAMIL.

Malay Apple, a name sometimes given to the rose-apple or sambos, *Eugenia sambos*, an East Indian tree, bearing long shining leaves and yellowish edible fruits, not unlike apricots in flavour. It may be grown in the stove-house.

Malay Archipelago, or MALAYSIA. See EAST INDIES.

is sandy. Immense deposits of alluvial tin occur in many places. The climate is damp, not very hot, and fairly uniform throughout the year, heavy rain being liable to fall at any season. The mountains and much of the flat country are still buried in primeval forests. The principal races are Malays and Malayo-Siamese

are essentially maritime, and although they have modified their piratical habits, they have never occupied the interior of any country except Sumatra, which they regard as their ancestral home. It is generally held that they form a branch of the Mongoloid stock; but so varied are their physical characters that it is safer not to regard them as belonging to any one race. Witty and even brilliant in conversation, dignified and even refined in intercourse with strangers, they have never produced a literature or an art. Most of the definitely Malay tribes profess Mohammedanism, but practise magic and ancestor-worship. Their dialect is closely akin to those of the South Sea islands, and has become to some extent the *lingua franca* of the Far East. They are polysyllabic, untuned, profuse in particular, poor in general terms, apt for irony, simile, and metaphor. Their most characteristic product is the *kris*, a thrusting weapon of many shapes. They are subject to fits of peculiar frenzy of a homicidal tendency, called 'running amok.' See Skeat's *Malay Magic* (1900); Maxwell's *Manual of the Malay Language* (1899); Wilkinson's *Malay-English Dictionary* (1903); Annandale and Robinson's *Fasciculi Malayenses*; Skeat's *Tribes of the Malay Peninsula* (1905); and many recent works by Clifford and by Swettenham.

Malay States (FEDERATED) occupy the centre of the Malay Peninsula, and have an area of 26,300 sq. m. They comprise Perak, Selangor, and Negri Sembilan on the w., and Pahang on the e. There is tin-mining in Perak and Selangor. Negri Sembilan is mostly agricultural, and much of Pahang remains unexplored. Pop. (1901) 678,593, of whom 312,486 were Malays, 299,739 Chinamen, and 1,422 Europeans and Americans. The governor of Singapore is high commissioner of these states; but each state has a native ruler, who acts under a British resident. The imports in 1904 totalled £3,686,713, excluding bullion and specie; and the exports £7,369,698, the chief export being tin and the chief import rice. The principal products are coffee, sugar, pepper, gambier, and tapioca. The forests yield timber, resins, canes, and gutta-percha. The state of Sungei Ujung was incorporated with Selangor in 1894. In 1887 Pahang accepted British protection.

Malchin, tn., Mecklenburg-Schwerin, Germany, between Lakes Malchin and Kummerow, 25 m. E.S.E. of Güstrow. It has railway workshops. Pop. (1900) 7,449.



Malay Peninsula, THE, reaches down from the mainland of Asia to within 2° of the equator; its extreme length is nearly 700 m., and its greatest breadth about 180 m. Its northern boundary is the isthmus of Kra, while the island of Singapore lies off its southern point. The interior is occupied by a range of mountains (8,000 ft. to 10,000 ft.). The soil of the coast region

half-breeds. The population exceeds 2,000,000. See further under MALAY STATES, SIAM, and STRAITS SETTLEMENTS. For bibliography, see MALAYS.

Malays, a brown-skinned, straight-haired, round-headed people, of low or medium stature, living in all the islands between Madagascar and the Philippines, but centred chiefly in the Malay Peninsula and Sumatra. They

Malcolm I. (MACDONALD), king of Scotland (943-954), annexed Moray, and received Cumberland from King Edmund (945).—**MALCOLM II.** (MACKENNETH), king of Scotland (1005-34), acquired Lothian and Cumbria north of Solway; he was the first to bear the territorial title 'Rex Scotiae'.—**MALCOLM III.** (CANMORE), king of Scotland (1054-93), made four invasions of England; two (1070 and 1091) in favour of Edgar Atheling being followed by counter-invasions, when he submitted. Having invaded Northumberland, he was ambushed and slain at Malcolm's Cross (1093). He married (1067) Margaret, sister of Edgar Atheling.—**MALCOLM IV.** ('the Maiden'), king of Scotland (1153-65), great-grandson of Canmore. When Somerled of Argyll rebelled, Malcolm surrendered to Henry II. (1157) Northumbria, Cumbria, also the strongholds of Newcastle, Bamborough, and Carlisle, receiving in return the shadowy earldom of Huntingdon.

Malcolm, SIR JOHN (1769-1833), Indian administrator and diplomatist, was born at Westerkirk, Dumfriesshire; entered the service of the East India Company in 1782. His first diplomatic post was that of assistant-resident at Haidarabad in 1798; in the following year he was appointed to the Mysore Commission, and between 1801 and 1810 thrice visited Persia as plenipotentiary. He drew up the peace negotiations with Scindia and Holkar in 1802, and arranged terms with the Peshwa in 1817. He was governor of Bombay from 1827 to 1831. His *Administration of India* (1833), *History of Persia* (1815), and *Life of Lord Clive* (1836) are his best known books.

Malda, dist., Bengal, India, E. of the Ganges. It is 1,813 sq. m. in area, and is engaged in the indigo and silk industries. The headquarters are at English Bazar, on the r. bk. of the Mahananda. Pop. (1901) 884,030.

Maldeghem, tn., prov. E. Flanders, Belgium, 6 m. W.N.W. of Eecloo. Industries include lace-making, fine basket-work, and tanning. Pop. (1900) 9,917.

Malden, city, Middlesex co., Massachusetts, U.S.A., 5 m. N. of Boston, of which it is a suburb. It manufactures rubber goods. Pop. (1900) 33,664.

Maldivé Islands, cluster of coral islands in Indian Ocean, 500 m. S.W. of Ceylon. None are more than 20 ft. above sea-level. Mali is the residence of the sultan, who pays tribute to the Ceylon government. Cocoanuts, cowrie shells, and coir are exported. The inhabitants resemble the Sinhalese, and are Mohammedans. The climate is unhealthy. Pop. (1901) 30,000.

Maldon. (1.) Municipal bor. and seapt., Essex, England, at the confluence of the Chelmer and the Blackwater, 44 m. E.N.E. of London. Industries include iron-founding, manufacture of agricultural implements, fishing, brewing, and salt-making. Near the town are remains of the Premon-

Norway, and Byrhtnoth, the 'alderman' of the East Saxons. No description can give an adequate idea of the vivid realism of this poem. It is a fragment of some 650 lines. The text is in Sweet's *Anglo-Saxon Reader*, and there is a translation in Freeman's *Old English History*.



Malays: Types, Village, and Weapons.

stratensian Abbey of Beeleigh. Pop. (1901) 5,564. (2.) Town, co. Talbot, Victoria, Australia, 89 m. N.N.W. of Melbourne. Pop. 2,800.

Maldon, THE BATTLE OF, an old English poem describing the battle fought in 991 A.D., between Olaf Tryggvason, later king of

Maldonado, cap. of dep. of same name, in S.E. Uruguay, S. America, on the N. side of estuary of La Plata, 67 m. E. of Montevideo. It is a fortified naval station and a seaside resort. Its fine harbour is well sheltered. It exports hides and cattle, and has limestone quarries.

Malebranche, NICOLE (1638-1715), French philosopher, born in Paris, and became a Roman Catholic priest. In his philosophy the general features of the system of Descartes were combined with elements derived from Platonism. According to Malebranche, we know nothing of the external world directly; we know external things only as they exist in idea in the divine reason, the ideas of them being presented to our minds on occasion of the corresponding impressions being made upon our bodies. The real existence of the external world itself thus becomes for Malebranche (as Christian believer rather than as philosopher) an article of faith, involved in the doctrine of creation. While his philosophical position has a certain resemblance to that of Berkeley, Malebranche is more directly connected with English philosophy by means of his disciple John Norris, an acute critic of Locke. Malebranche's two chief works are *Recherche de la Vérité* (1674; Eng. trans. 1694), and *Entretiens sur la Métaphysique* (1688). See Adamson's *Development of Modern Philosophy* (1903).

Male Fern, the popular name of the commonest of British indigenous ferns, *Aspidium filix mas* or *Lastrea filix mas*. It is a robust growing species, with sturdy, green, bipinnate fronds, often three feet or more in length, usually forming a sort of truncated inverted conical tuft round a central crown. The stipe is densely scaly, the sori are circular, and the involucre is reniform. The dried rhizome is used in medicine as a cure for tapeworm. Its action is thought to be due to its effect as a stimulant of the involuntary muscles of the viscous containing it. Little or none becomes absorbed into the system, but powerful peristaltic contractions are set up in the course of a couple of hours or less. The male fern and many of its varieties are valuable hardy plants for garden and woodland.

Malér Kotla, chief tn. of Maler Kotla state, Punjab, India, 30 m. s. of Ludhiana. Pop. (1901) 21,122. The state has an area of 162 sq. m., and a population (1901) of 77,506.

Malesherbes, CHRÉTIEN GUILAUME DE LAMOIGNON DE (1721-94) French statesman, born at Paris. In 1750 Malesherbes, who had become a counsellor of the Parlement of Paris, succeeded his father as president, and became superintendent of the press. In 1770 he was exiled with the other members of the Parlement of Paris. On the accession of Louis XVI., in 1774, he not only regained his post of president of the Court of Aids, but was made minister of

state. His views were patriotic and enlightened; but finding that he could not secure the adoption of his liberal policy, he resigned in May 1776, and resided in Switzerland till 1786. In that year he was recalled, and drew up two memoirs, *On the Calamities of France*, and *The Means of Repairing Them*. But his advice was not taken, and he again retired. On the trial of the king Malesherbes offered his services as advocate. This roused the hostility of the Jacobins, and in April 1794 he was executed.



Male Fern (*Lastrea filix mas*).

1, Front; 2, lower surface of frond, showing clusters of spore cases.

Malet. See MALLET.

Malet, LUCAS. See KINGSLEY.

Malet, SIR EDWARD BALDWIN (1837), British diplomatist, born at the Hague; was chargé des archives in Paris during the commune; minister plenipotentiary at Constantinople (1878-9) and at Brussels (1883); ambassador at Berlin (1884-95); and a member of the International Arbitration Court at the Hague (1900). Author of *Shifting Scenes* (1901).

Malherbe, FRANÇOIS DE (1555-1628), French poet, generally regarded as the founder of the classical school, was born at Caen, and attached himself to Henry IV., and to his successor Louis

XIII. He insisted on correctness and elegance of diction, and his own verses are the best illustration of the bad effects of trying to make the muse walk in fetters, even when these are gilded and polished. His *Œuvres Complètes* were edited by Lalanne (1862-9). See also Sainte-Beuve's *Causeries*, vol. viii., and Gournay's *Vie* (1892).

Malibran, MARIA FELICITA (1808-36), operatic singer, born in Paris, a daughter of the Spanish tenor Manuel Garcia. She made her début in 1825 in London, carrying the musical world by storm. From 1830 she sang continuously in Paris, Rome, London, and elsewhere.

Malic Acid, hydroxysuccinic acid, $\text{COOHCH}_2\text{CH}(\text{OH})\text{COOH}$, is a dibasic hydroxyacid occurring in unripe fruits, particularly in the berries of the mountain ash, from which it may be obtained as a calcium salt by boiling with milk of lime. It may be prepared synthetically by boiling bromosuccinic acid with silver oxide and water, and forms hygroscopic crystals (m.p. 100°C ., sp. gr. 1.56), which in the case of the synthetically prepared variety are a mixture of dextro and levo rotatory forms, the natural variety being dextro-rotatory. Malic acid on reduction yields succinic acid, and when heated loses water, and yields the isomeric fumaric and maleic acids.

Malice. The word is used in different senses. In criminal law malice, not in the sense of malevolence, but in that of criminal intention, is an essential ingredient in every crime; and in the case of murder a further kind of malice, called 'malice aforethought,' must be present. (See MURDER.) In the case of civil wrongs the presence or absence of malice in the sense of bad motive is, as a general rule, immaterial. The exceptions are:—(1) Actions for slander of title; (2) actions for malicious prosecution; (3) maliciously inducing others to break their contracts. The question of malice also becomes important in actions for defamation, in which the defence of privilege, when it is set up, may be rebutted by evidence of actual malice. An act lawful in itself is not converted by a malicious or bad motive into an unlawful act so as to make the doer of the act liable to a civil action. There is a presumption as to infants between seven and fourteen that they cannot commit a felony; but this presumption is rebutted by evidence of malice—i.e. conscious wrongful intent.

Malicious Injury to Property. The various criminal acts constituting malicious injury to property are dealt with by the Malicious Damage Act, 1861. In

every case the act must be done 'unlawfully and maliciously,' and malice towards the particular owner of the property need not be proved—it is sufficient to prove a general intent to injure. The following are offences:—(1.) For persons to riotously assemble and demolish buildings or machinery: penal servitude for life. (2.) Riotously injuring buildings or machinery: seven years. (3.) Tenants damaging their houses: a misdemeanour. (4.) Damaging goods in course of manufacture or weaving, etc., machinery: penal servitude for life; other machinery: seven years. (5.) Damaging shrubs, etc., over £1 in value in a garden, or over £5 in value elsewhere: penal servitude for five years. (6.) Damaging trees to value of a shilling: three months or £5. (7.) Destroying vegetables in garden: six months; not in garden: one month. (8.) Damaging walls, etc.: £5 fine. (9.) Flooding coal mine or damaging mine engine: seven years. (10.) Destroying sea or river banks: penal servitude for life. (11.) Damaging fishery or poisoning fish: seven years. (12.) Destroying bridge: penal servitude for life. (13.) Attempting to throw a train off the line: penal servitude for life. (14.) Injuring telegraphs, etc.: two years. (15.) Destroying works of art in museums and public places: six months. (16.) Killing or maiming cattle: fourteen years; other domestic animals: six months. (17.) Exhibiting false lights for ships: penal servitude for life. (18.) Removing buoys: seven years. (19.) Destroying wrecks: fourteen years. (20.) Other offences with over £5 damage: five years or £5 compensation. In Scotland malicious injuries are punishable at common law, but various statutes also deal with certain cattle-maiming, railway offences, damages to fishing boats, submarine cables, and post-office offences. (See also ARSON.)

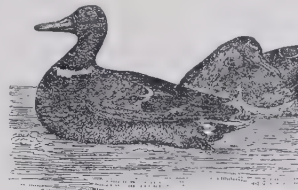
Malicious Prosecution. If a man is prejudiced in his person or property by a malicious criminal prosecution, he has a right of action against the wrongdoer. In an action for malicious prosecution the plaintiff, to succeed, must prove (1) that he was innocent; (2) that there was want of reasonable and probable cause for the prosecution; (3) that the prosecution was initiated maliciously—i.e. from an indirect or improper motive, and not in the furtherance of justice. Actions will also lie for maliciously making a man bankrupt, or having him arrested, petitioning to wind up a company, or obtaining a search warrant. See Stephen's *Malicious Prosecution* (1888).

Malignant Pustule. See ANTHRAX.

Malignants, a name generally applied by the Puritans to the supporters of the king against Parliament, and even as a term of reproach to the kings themselves. It was originally used to designate men such as Laud and Strafford, who urged the king to maintain his absolute and arbitrary attitude. After the restoration it was used by the Covenanters and others as descriptive of those in authority.

Malindi, cap. of dist. of Malindi, British E. Africa, 70 m. N.E. of Mombasa. Pop. 5,000. The district has about 10,000 inhabitants.

Malines, or MECHLIN, tn., Belgium, 13 m. S.E. of Antwerp; is the see of the cardinal-primate of Belgium, and is noted for its vast Gothic cathedral, dating partly from the 13th century, and containing Van Dyck's *Crucifixion* and Rubens's *Last Supper*. Other works of Rubens are in the churches of Notre Dame and St. John. Among other interesting buildings are the Cloth Hall, the law courts, and the archbishop's palace. Formerly important for lace, shawls, and linen, its chief manufactures are woollen goods and 'Gobelin' tapestry, with cabinet-making and carpentry. Pop. (1900) 55,705.



Mallard.

Mallard, or COMMON WILD DUCK, a bird which is widely distributed over Europe, Asia, and N. America, but is now not very common as a breeding species in Britain. The term mallard is strictly applicable only to the drake, but it is convenient to use it for both sexes. In the drake the head is green with a white collar, the back of the neck and the breast dark chestnut, the rump black, the wing-spot greenish purple fringed with white, and the under surface grayish white. The four central upper tail coverts are black and curly. The female is brown and buff, with a green wing spot, and is smaller than the male. In captivity the bird breeds freely with almost any species of duck.

Mallarmé, STÉPHANE (1842–98), French poet and man of letters, born in Paris. His verses contain much that is beautiful

in sentiment and crystallized in mode of expression; but owing to the theorizing nature of his temperament and the sway of a too critical faculty, his ideas were often clouded and obscure. In 1888 he issued a translation of the poems of Edgar Allan Poe. His *Poésies Complètes* appeared in 1887 (new ed. 1899), and a volume of *Vers et Prose* in 1893.

Malleability, the property, almost exclusively possessed by a number of the metals, in virtue of which they can be flattened by hammering or pressure without crushing. This feature is most marked in the case of gold, which can be beaten out to such a degree of tenuity that one ounce will cover 189 sq. ft.

Mallee Scrub, an Australian species of eucalyptus, which forms dense thickets about eight feet in height. It will thrive in almost pure sand, and will tolerate both frost and scorching winds. Much of the eucalyptus oil of commerce is derived from this species.

Mallein, a poisonous compound obtained from the products of the bacillus of glanders, and which is used in veterinary practice to diagnose the disease.

Malleson, GEORGE BRUCE (1825–98), English writer on military history, was born in London. In 1852 he served in the first Burmese war, and subsequently was sanitary commissioner in Bengal and controller of military finance. For some time he was Indian correspondent of the *Times*. Chief works: *History of the French in India* (1868; new ed. 1893); *History of Afghanistan* (1879); *The Founders of the Indian Empire* (1882). He also completed Sir John Kaye's *History of the Indian Mutiny* (3 vols. 1878–80).

Mallet, originally MALLOCH, DAVID (?1705–65), Scottish poet and author, was born near Crieff, Perthshire, and became a friend of James Thomson, author of *The Seasons*. From 1720 onwards he wrote *William and Margaret*, a ballad; *Eurydice*, a tragedy (1730–31), produced in London; *Mustapha* (1738–9), which met with success largely on account of its political reference. He edited the *Works of Bolingbroke* in 1754, and produced the masques *Alfred* (1740), *Britannia* (1755), and *Elvira* (1762–3). His works were published in 1759 (3 vols.), and his *Ballads and Songs*, annotated by F. Dinsdale, in 1857. The masque *Alfred* was written in conjunction with James Thomson, and it is uncertain whether Mallet or Thomson wrote the song 'Rule, Britannia' which is introduced. See Johnson's *Lives of the Poets* (1791), vol. iv.

Mallock, WILLIAM HURRELL (1849), English author, was born at Cockington, Devon. He has

Mallorca

written brilliantly, if not very profoundly, on religious, philosophical, and social questions, besides several novels. His writings are often highly poetic as well as divertingly humorous and sarcastic. Chief works: *The New Republic* (1877), *The New Paul and Virginia* (1878), *Is Life worth Living?* (1879), *Property and Progress* (1884), *Social Equality* (1882), *A Human Document* (1892), *Romance of the Nineteenth Century* (1881), *The Veil of the Temple* (1904), and *The Reconstruction of Belief* (1905).

Mallorca. See MAJORCA.

Mallow, or **MALVA**, a genus of herbaceous plants belonging to the order Malvaceæ. They bear white or purplish flowers. The perennial native species *M. moschata*, the musk-mallow, with its white-flowered variety *M. m. alba*, is the handsomest of the genus.

Mallow, tn., Co. Cork, Ireland, 20 m. N. of Cork, on the Blackwater. Remains exist of a castle, formerly a stronghold of the earls of Desmond. It has a milk-condensing factory, flour mills, and salt works. Pop. (1901) 4,542.

Malmaison, LA, château on l. bk. of Seine, 5 m. w. of Paris, France; was purchased by Josephine Beauharnais in 1789. After her divorce from Napoleon (1809) she lived and died in it (1814).

Malmesbury, munic. bor., Wiltshire, England, 11 m. s.w. of Cirencester, on the Avon. The church of St. Mary formerly belonged to the Benedictine abbey, founded early in the 7th century. The present edifice retains portions of Norman architecture, and in the churchyard is the detached tower of another church. A richly-sculptured market cross dates from the reign of Henry VII. Pillow lace is a domestic industry. Pop. (1901) 2,854.

Malmesbury, JAMES HARRIS, EARL OF (1746-1820), English diplomatist, born at Salisbury; became minister at Berlin in 1772, at St. Petersburg (1777), and the Hague (1784). He is best known as one of the Whigs who seceded from Fox to Pitt in 1793, and as the man who was entrusted with the duty of marrying, by proxy, the Princess Caroline, whom he brought to England in 1795.—**JAMES HOWARD HARRIS, THIRD EARL** (1807-89), edited his grandfather's diaries and correspondence, and published his own *Memoirs of an Ex-Minister* (1884). He entered Parliament for Wilton in 1841. He served as Foreign Secretary in 1852 in Derby's administration, and again in 1858-9; and later (1866-8 and 1874-6) was Lord Privy Seal.

Malmesbury, WILLIAM OF (c. 1095-1143), Anglo-Norman chronicler, was reared in the religious house of Malmesbury, of which

he was afterwards librarian. His *Gesta Regum Anglorum* (from the earliest times to 1127-8) and *Gesta Pontificum Anglorum* were finished in 1125, and revised 1135-40; and *De Antiquitate Glastoniensis Ecclesie* was written between 1129 and 1139. The *Historia Novella* (sequel of the *Gesta Regum*) ends with Matilda's escape from Oxford (1142). See Stubbs's edition of *Gesta Regum Anglorum* (1887-9).

Malmö, cap., Swedish co. of Malmöhus, on the Sound. The Earl of Bothwell was for a time imprisoned in the old castle. The artificial harbour (1775) is one of the largest in Scandinavia. Malmö has iron works, woollen mills, dockyards, machinery, sugar, steam-mill factories, and breweries. Pop. (1900) 60,857.

Malmsey, also known as Malvoisie, a rich, sweet, luscious white wine formerly produced in Candia (Crete), Malvasia (Morea), and certain of the Greek islands. Vines of this variety were planted in Teneriffe, Madeira, Canary Is., and the Azores. The wine contains about 19 per cent. of alcohol by volume. It is said that George, Duke of Clarence (1477), was drowned in a butt of this wine.

Malmström, BERNHARD ELIS (1816-65), Swedish poet, was born at Tysslinge (Nerike). His works are perfect in form, lofty in sentiment, and lucid in expression, in contrast to the romantic school, which he criticised severely. His greatest work is *Angelika* (1840), a series of elegies, which made him famous. He also wrote *Fiskarflickan från Tynnelsö*, besides shorter poems. His *Samlade Skrifter* appeared in 8 vols. in 1866-9.

Malmström, CARL GUSTAF (1822), Swedish historian, became professor at Lund (1863), at Upsala and member of the Academy (1877), keeper of the Record Office (1882-7). His principal works are *Sveriges Politiska Historia, 1719-72* (6 vols. new ed. 1893-1901), and *Om Embetsmännens Ställning till Riksdagen under Frihetstiden* (1869).

Malolos, tn., Bulacan prov., Luzon, Philippines, 7 m. N. of Manila Bay; was the first republican capital (1899). Pop. 14,600.

Malone, EDMUND (1741-1812), Irish author and critic, was born in Dublin. In 1777 he went to London, where he became well known in literary and political circles. In 1778 he published an *Attempt to ascertain the Order in which the Plays of Shakespeare were written*, which remains substantially correct. His critical and historical supplement to Johnson's edition of *Shakespeare* appeared in 1780. Malone's edition of the plays (1790) embodied

the results of long and elaborate research. In 1800 he published *The Critical and Miscellaneous Prose Works of John Dryden*. A new edition of *Shakespeare*, for which Malone left material, was published by the younger Boswell (1821). See *Life* by Sir James Prior (1864), also *Memoir* in Boswell's edition of *Shakespeare* (1821).

Malonic Acid, CH₃(COOH)₂, is a dibasic acid occurring in beet, and is prepared synthetically by the hydrolysis of cyanacetic acid. It crystallizes in large tablets, is soluble in water (m.p. 134° C.), and is decomposed when heated into carbon dioxide and acetic acid. Its ethyl ester is a valuable agent in the synthesis of carbon compounds.

Malope, a genus of annual hardy herbaceous plants belonging to the order Malvaceæ. They bear showy violet or rose coloured flowers, and are worth growing in a light soil in a sunny situation.

Malory, SIR THOMAS (fl. 1470), author of *Le Morte Arthur*, has been identified by Professor Kittidge—*Who was Sir Thomas Malory?* (1895)—with a certain Sir Thomas Malory of Newbold Revell in Warwickshire, who appears to have succeeded to the family estates in 1433 or 1434. He has condensed his matter ruthlessly, all the great prose branches (*Merlin, Tristan, Lancelot*, with *Queste and Morte Arthur*) being represented in a mutilated form. The modifications which he introduced into the text—e.g. the parting of the lovers in bk. xx., and their final meeting at Almesbury—together with the simplicity and virile force of the language, have caused among English readers an entirely mistaken view of the story, as a love story, and the morality of the Arthurian legend as a whole. The best edition is that by Dr. Sommer (3 vols. 1889-91), though the critical section is far from accurate. There is a popular edition in the Globe Series. See also *Sir Thomas Malory's 'Le Morte Arthur' und die Englische Arthurndichtung des XIX. Jahrhunderts*, by Schüler (1900).

Malpighi, MARCELLO (1628-94), Italian anatomist, born at Crevalcore, near Bologna; was professor of medicine at Pisa, Messina, and Bologna (1666-91). He was one of the first to apply the microscope in anatomical study, and made important discoveries as to the structure of the kidneys, lungs, skin, and spleen, giving his name to various organs or parts of such. He also carried out important investigations in the anatomy of plants, his *Anatomia Plantarum* (1675-9) being a classic in vegetable histology. His *Opere* were published in 1686-94.

Malpighia, a genus of tropical American evergreen trees and shrubs belonging to the order Malpighiaceæ. They bear pink or white flowers, followed by fleshy drupes. They are sometimes cultivated as stove plants, a peaty soil being required. *M. glabra*, the Barbados cherry, is extensively cultivated for its fruit in the W. Indies.

Malplaquet, vil., dep. Nord, France, 10 m. s. of Mons; was the scene of the victory of Marlborough and Prince Eugene over the French under Villars and Boufflers on Sep. 11, 1709.

Malstatt-Burbach, tn., Rhine prov., Prussia, on r. bk. of Saar, 35 m. N.E. of Metz; has coal

quarried. Filigree, lace, and lucifer matches are manufactured. Malta is a British crown colony and a strong fortress. It is one of the most important ports of call in the world, being also the naval base of the Mediterranean fleet. The common Maltese language is mainly debased Arabic. Roman Catholicism is the chief religion. The island has a university. The trade is mainly transit; in 1904-1905 the imports were valued at £9,735,859, and the exports at £8,444,024. Valetta is the capital. A railway connects it with the old capital of Citta Vecchia, 6 m. w. Pop. (1903) 193,315; garrison, about 10,115.

Malta, KNIGHTS OF. See HOSPITALIERS.

Malte-Brun, KONRAD (1775-1826), Danish geographer, was born at Thisted, Jutland; but being exiled, he settled in France. With Mentelle and Herbin, he produced a geography of the world far superior to anything previously existing. Chief works: *Précis de la Géographie Universelle* (8 vols. 1810-29), *Mélanges Scientifiques et Littéraires* (3 vols. 1828). One of the founders of the Société Géographique.

Maltebrun, VICTOR ADOLPHE (1816-89), French geographer, son of Konrad Malte-Brun, was born in Paris. He was professor of history at several colleges, but



mines and iron works. Railway carriages and cement are manufactured. Pop. (1900) 31,195.

Malt. See BREWING.

Malta (anc. *Melita*), isl. in Mediterranean, 58 m. s. of Sicily; with Gozo and Comino, it covers an area of 117 sq. m. Malta itself has an area of 95 sq. m. Its coasts are deeply indented. The highest point is 845 ft. above sea-level. The climate is mild and healthy in winter, but in summer the heat is intense. The soil is thin, but very fertile, and is cultivated with untiring energy by the natives. Corn, potatoes, vegetables, oranges, figs, and cotton are produced for export. Maltese honey is famous. Marble, alabaster, and building-stone are

Malta was colonized by the Phoenicians, and thereafter held by the Greeks, and then by the Carthaginians, until the Romans took it in 216 B.C. St. Paul's Bay, on the N.E., was the scene of St. Paul's shipwreck in 62 A.D. Subsequently the island was occupied by Vandals, Arabs (870), and Normans (1090) from Sicily. After the capture of Rhodes by Solymán in 1522, Malta was granted (1530) by Charles v. to the Knights of St. John of Jerusalem. Taken by Napoleon in 1798, Malta surrendered to the British in September 1800. See *Malta under the Phoenicians, Knights, and English*, by Tullack (1861); and *Malta and the Knights Hospitaliers*, by Bedford (1894).

in 1847 devoted himself to geographical studies, became general secretary to the Geographical Society, and was chief editor of *Nouvelles Annales des Voyages*. His chief work was *La France Illustrée* (1855-7; new ed. 1879-84).

Maltese Terrier, THE, is reputed to have been the ladies' lapdog of ancient Rome and Greece. It is a fluffy little white snowball, weighing from 5 lbs. to 7 lbs., and without a single terrier characteristic. Points:—Coat very long, straight, and silky, quite free from wooliness or the slightest curl; colour pure white; nose black, as also the roof of the mouth; eyes bright and dark; ears moderately long, the hair

on them mingling with that on the neck; tail short and well feathered, and curled tightly over the back.



Maltese Terrier.

Malthus, THOMAS ROBERT (1766–1834), English political economist, was born near Guildford, Surrey. In 1805 he was appointed professor of history at Haileybury—a post he retained till his death. It was Godwin's *Enquiry*, with its view of man's perfectibility (1797), which led him to the law that population treads ever on the limits of subsistence. Malthus never said there could be an excess of population. Such excess was wiped out, so to speak, before it came into existence by the checks of vice and misery. Consequently Godwin's theories were refuted by the facts of nature. The *Essay on Population* (1798) created a tremendous sensation at the time, and the author has probably been the best abused man in the 19th century. He almost formulated the law of diminishing returns, and he had elaborate controversies with Ricardo regarding rent. See Bonar's *Malthus and his Work* (1885).

Malton, tn., N. Riding, Yorkshire, England, 21 m. by rail from York. The church of St. Mary forms part of the 12th-century priory church. Malton has corn mills, foundries, implement works, and breweries. Pop. (1901) 4,758.

Maltose, $C_{12}H_{22}O_{11} \cdot H_2O$, a sugar produced by the action of the diastase of malt on starch, about four-fifths of the latter being changed into maltose. It forms crystalline crusts (sp. gr. 1.54), reduces Fehling's solution, is fermented by yeast, and is hydrolyzed to grape sugar by boiling with diluted acids. In constitution it is the anhydride of glucose, and is an aldehyde-alcohol, containing eight alcoholic hydroxyl groups. Maltose is optically active, rotating the plane of polarization 140° to the right. It is the main source of the alcohol in fermented malt liquors.

Malvaceæ, a natural order of herbaceous plants, shrubs, and trees, with alternate leaves and axillary flowers, each of which includes five sepals united at the base, five petals, numerous sta-

mens—their filaments united so as to form a tube—and several carpels united in a radiate manner to form the ovary. Among the genera are Hibiscus, Malva, Althea, and Lagunaria.

Malvastrum, a genus of American herbaceous plants, bearing spikes of yellow or scarlet flowers, and belonging to the order Malvaceæ.

Malvern, GREAT, wat.-pl., Worcestershire, England, 8 m. s.s.w. of Worcester, on E. slope of Malvern Hills. The parish church formerly belonged to an 11th-century Benedictine priory, and contains 15th-century stained glass. Here is Malvern College. Malvern owes its celebrity to its springs, and to its clear, dry, and equable climate. The first hydropathic establishment in the United Kingdom was erected here in 1842. Pop. (1901) 16,448.

Malvern Hills, range, with abrupt heights, running 9 m. N. and S. between Worcestershire and Herefordshire, England. The highest summit is Worcestershire Beacon, 1,395 ft.

Malwa, prov. of Central India, occupying plateau (alt. 1,500–2,000 ft.) bounded on W. by Aravalli Mts., and S. by the Vindhya chain. It contains the following feudatory states: Indore, Bhopal, Dhar, Jaora, Rajgarh, Ratlam, Narsinghar, and Nimach. Opium is largely cultivated.

Malwan, seapt., Ratnagiri dist., Bombay, India, 50 m. N.W. of Goa, formerly a stronghold of the Maratha pirates. Iron ore is found in the neighbourhood. Pop. (1901) 19,626.

Mamelukes, a term derived from an Arabic word meaning 'slaves.' They were originally a body of Turkish slaves (some 12,000) whom Sultan Es-Salih Eyyub introduced in the 13th century. After his death, and in the absence of capable successors, the Mamelukes elected a sultan out of their own number; and from that date (1251) till 1517 Egypt was ruled, and well ruled, by a succession of these military slave-kings, who are usually grouped in two lines—the Bahri (1250–1388) and the Burji (1388–1517). The occupant of the throne was the strongest man for the time being, and his successor was the stronger man who ousted him. The Bahri rulers were mostly men of Turkish blood, while the Burji rulers were principally Circassians. The rule of these kings, however tumultuous and uncertain, was enlightened, and Egypt—Cairo in particular—owes to them the most beautiful of its mosques. In 1517 the dominion of the Mamelukes was overthrown by the Ottoman Turks under Selim I., who, however, left them supreme in the provinces. In

the 18th century they were again absolute masters of the country, though nominally subject to Turkish rule. The Mamelukes made their last noteworthy appearance when Napoleon defeated them (1798) at the battle of the Pyramids. Mehemet Ali, acting for the Porte, finally crushed them in two treacherous massacres (1805 and 1811). See Makrizi's *Histoire des Sultanes Mamlouks* (trans. by Quatremere, 1837–41).

Mamers, tn., dep. Sarthe, France, 14 m. E.S.E. of Alençon; its church of Notre Dame dates from the 12th century, and that of Saint Nicolas from the 13th century. It has manufactures of hosiery, and of linen and woollen fabrics. Pop. (1901) 6,045.

Mamiani della Rovere, TERNIZIO, COUNT (1799–1885), Italian poet, philosopher, and statesman, was born at Pesaro; took part in the revolutionary movements of 1831, and was banished. He lived at Paris till 1846, and then became professor of philosophy at Turin. Subsequently he was several times minister under Cavour. In philosophy he was first an empiricist, and gradually became a Platonist. One of his works appeared in English (*Rights of Nations*, trans. by R. Acton, 1860). In his youth he versified sacred legends in the *Inni Sacri* (1832), and dealt with nature and national themes in the *Idilli* (1836). All his works are inspired with the noblest patriotism. Mestica edited his *Prose e Poesie Scelte* (1886). See monographs by Gaspari (1888), Bianchi (1896), and Casini (2nd ed. 1896).

Mamilius, the name of a distinguished family at Tusculum in ancient Italy. After Tarquin's expulsion from Rome, Octavius Mamilius roused the Latins against the new republic, and was killed in the battle at Lake Regillus in 498 B.C.

Mammals, the highest class of vertebrates, characterized by their hair. Sometimes the hair is but scantily developed, and in the Cetacea it is functionally replaced by the layer of blubber—or fat—beneath the skin; but in all cases it is present to some extent, if only during fetal life. In connection with the hair there is developed a system of skin-glands, some of which are invariably modified to form the mammary glands. The two cavities of chest and abdomen are separated by a complete muscular partition, the diaphragm, which has much to do with the movements of respiration. The heart is four-chambered, and the single aortic arch curves to the left side, and not to the right as in birds; the lungs lie freely in the chest cavity, and are not bound down by membrane, as in birds;

the surface of the brain is usually well convoluted, and the brain shows a number of anatomical peculiarities. Similarly, the skeleton of a mammal can be distinguished from that of any other vertebrate by a number of characters. For example, in the skull there are two facets, or condyles, for articulation with the backbone; the lower jaw consists of but one bone at each side; there are three little bones in the middle ear; the sutures, or lines of junction of the bones of the skull, usually remain distinct throughout life; and in most cases teeth of characteristic complexity are present in both jaws. Again, in the neck there are, with rare exceptions, only seven vertebrae; a bone called the coracoid, very important in birds and reptiles, is, except in monotremes, absent from the shoulder girdle of mammals.

Mammals are typically terrestrial animals, furnished with four limbs. But a few have become fitted like birds for an aerial life—e.g. bats. Many have become aquatic, and here the whales mark the culminating point; similarly the mole shows the maximum adaptation to the fossorial life, and the monkey to the arboreal.

In classifying mammals, stress is laid in the first instance on the methods of reproduction. Mammals are in the general case distinguished from lower vertebrates by the fact that they give birth to living young, in place of laying eggs; but three living mammals lay eggs like birds and reptiles. It is, therefore, necessary to separate these mammals from all the rest, and form of them a separate sub-class, called Prototheria, or primitive mammals. Above this sub-class we come to the order of marsupials (e.g. kangaroo) in which the young are born alive, but in a very imperfect state of development, and are placed after birth in a pouch by the mother. These constitute the sub-class Metatheria, or later mammals. Finally, all other mammals give rise to fully developed young, and are included in the sub-class Eutheria, or well-developed mammals. In the Prototheria the brain is usually smooth, and its details of anatomy are somewhat reptilian; the coracoid is as well developed as in a reptile; as in marsupials, there are epipubic bones on the abdominal wall; the mammae, present in all other mammals, are here absent, and the milk is secreted merely on a bare patch of skin, from which it is licked by the young. Associated with the egg-laying habit are certain peculiarities of the reproductive organs of the reptilian, and not of the characteristic mammalian

type. (See further ORNITHORHYNCHUS and ECHIDNA. In the marsupials, as in monotremes, two epipubic bones are present; but these have not, as is generally supposed, anything to do with the pouch. The brain is smaller and simpler than that of the higher mammals, and the reproductive organs are, generally speaking, intermediate between those of monotremes and those of the higher mammals. A point on which great stress was formerly laid in distinguishing between Metatheria and Eutheria is that, whereas in the latter the allantois unites with the uterine wall to form the complex structure known as the placenta, by means of which the unborn young are nourished during the prolonged period of gestation, in the marsupial the allantois remains small, and was formerly believed never to form a placenta. It has, however, been recently shown that in certain marsupials a true though small allantoic placenta does exist, and the general belief now is that the marsupials have been descended from ancestors which possessed a placenta like that of the Eutheria. The marsupials were once widely distributed over the globe, but are now confined to the Australian area, save for a few which are found in America. In the Eutheria the period of gestation is relatively long, the young are nourished before birth by the placenta, and their dependence on the mother's milk is less prolonged and less absolute than that of the marsupials. The brain is well developed, the reproductive organs are highly differentiated; there are no epipubic bones; as in marsupials, the coracoids are represented merely by a process of the shoulder-blade. The mammalia may be classified as in the following table:—

Sub-class: 1. PROTOTHERIA.

Order Monotremata — example, ornithorhynchus.

Sub-class: 2. METATHERIA.

Order: Marsupialia — kangaroo.

Sub-class: 3. EUTHERIA.

Orders—

- (1) Edentata—sloth.
- (2) Sirenia—manatee.
- (3) Ungulata—horse.
- (4) Cetacea—whale.
- (5) Rodentia—rabbit.
- (6) Carnivora—tiger.
- (7) Insectivora—mole.
- (8) Chiroptera—bat.
- (9) Primates—monkey.

The insectivora, usually placed high in the list on account of their affinities with the primates, show many indications of a descent from primitive forms. They seem to be related to marsupials, and it is probable that the primi-

tive insectivores arose from a marsupial stock. From the insectivores have arisen the bats, or chiroptera, and the primates. Again, though the existing carnivores, ungulates, and rodents are sharply separated from one another, these lines of demarcation are largely obliterated when the history of the orders is followed geologically. As we pass backwards, the members of all three orders approach more and more to the insectivore type, and they were probably all derived from an insectivore stock. Of the origin and relations of the remaining orders little is known.

It is perhaps now the general opinion that the monotremes are off the main line of descent—that is, that their immediate ancestors did not give rise to the other mammals. There can now be little doubt that Metatheria and Eutheria have had a common origin. But the nature of this ancestral stock—whether amphibian or reptilian—is still uncertain. The earliest known mammals are found in the Triassic beds.

It was the difficulties connected with the distribution of mammals that first directed Darwin along the line of thought which ended in the publication of the *Origin of Species* (1859). Such facts as the presence of marsupials in S. America and in Australia, but nowhere else, the presence of the tapir in S. America and in the region of the Malay, of lemurs in Africa and in India, but nowhere else, and many similar problems otherwise insoluble, become at once explicable if the theory there laid down be granted. Some problems of distribution still, however, remain obscure—e.g. the reason for the disappearance of the horse from S. America prior to the human period. (See further under EMBRYOLOGY.) See *Mammals Living and Extinct*, by Flower and Lydekker (1891); *Mammalia*, by F. G. Beddard (*Cambridge Natural History*, vol. x, 1902); and *The Royal Natural History* (1893-5) may be consulted for more popular accounts. For distribution, consult *A Geographical History of Mammals*, by R. Lydekker (1896); and see also article GEOGRAPHICAL DISTRIBUTION. For fossil forms, see vol. ii. of Nicholson and Lydekker's *Manual of Paleontology* (1889). For the development, see Hertwig's *Text-book of the Embryology of Man and Mammals* (trans. by Mark, 1892); Foster and Balfour's *Elements of Embryology* (1883). In studying the skeleton, Flower's *Osteology of the Mammalia* (3rd ed. 1885) will be found invaluable; while for British forms, see Lydekker's *British Mammals* (1895) and Bell's *British Quadrupeds* (2nd ed. 1874).

Mammea, a genus of tropical trees belonging to the order Guttiferae. They bear indehiscent drupes, the best-known species, *M. americana*, the mammee tree, being especially valued for its fruit. The aromatic liqueur eau de Cr  le is distilled from the flowers of this species. The flowers are white and fragrant, and are borne in summer. Mammeas may be cultivated in stove heat, if given a light fibrous loam containing a moderate proportion of leaf-mould.

Mammillaria, a genus of tropical succulent plants belonging to the order Cactaceae. They bear usually solitary flowers growing from the axil of the tubercle. The plants average about six inches in height, the stems being cylindrical or globular, and the plants absolutely symmetrical in form. They generally bear spines in neat rosettes. Mammillarias are not difficult to grow under glass if plenty of light and moderate heat be af-

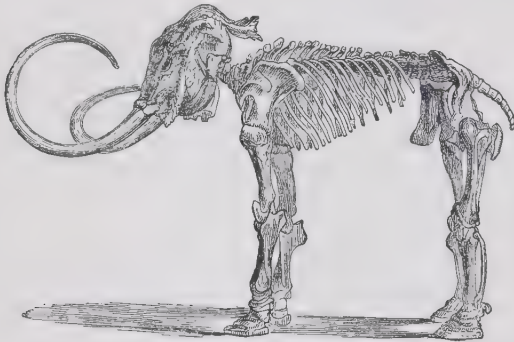
than ten feet long. In the south of Europe the mammoth was contemporaneous with cave-man, and rude but spirited sketches of it have been found engraved on ivory. See Sir Henry Howorth's *The Mammoth and the Flood* (1887), and Dr. Leith Adams's *British Fossil Elephants* (Palaeontographical Society; 1859).

Mammoth Cave, largest known cave in the world, Edmonson co., Kentucky, U.S.A., between Nashville and Louisville. The largest chamber, known as Chief City, is 450 ft. long, 130 ft. wide, and 50 ft. high. Cleveland's Avenue is more than two miles long. Its Echo River communicates by an underground passage with Green R. The animal life is confined to a few species of crayfish, insects, and bats. The cave was discovered in 1809 by a hunter named Hutchins. See Hovey's *Celebrated American Caverns* (1882).

Mammoth Hot Springs. See YELLOWSTONE PARK.

form a regular, uninterrupted, horseshoe-shaped series, the canines being small in both sexes, and not protruding. In connection with the upright position the skeleton shows a number of minor peculiarities: thus, the vertebral column presents a characteristic sigmoid flexure, only indicated in the apes; the lower limbs are proportionately much longer; the great toe is long and strong, and in the adult is incapable of being opposed to the other toes. Again, the heel is better developed than in any anthropoid, and the foot has been so modified that it can be placed flat upon the ground. We may say concisely that, from the zoological standpoint, man differs from the anthropoids in (1) his adaptation to the erect position and the terrestrial habitat, in (2) his greater brain development, and in (3) the very fully developed social instinct. To the zoologist there can be no reasonable doubt that he has arisen from an anthropoid stock of (mainly) arboreal habitat.

Although after infancy the upright position is the one habitually adopted by man, yet it is a position which he can only maintain for a relatively short period without fatigue. This seems inexplicable, save on the assumption that the position is a recent acquisition. Another interesting point is the presence of a separate tibia and fibula in the lower limb. The persistence of so primitive and apparently so useless a structure as a free fibula can only be explained on the supposition that it is an inheritance from an arboreal ancestor, to whom the free movement of the ankle-joint rendered possible by its presence was a necessity in climbing. The well-developed clavicles and some associated peculiarities of the scapula can, similarly, only be explained on the assumption that man is descended from a climbing ancestor. The reduction in number of the offspring to one (or two) at birth, and the corresponding reduction of the mammae and their thoracic position, are likewise heritages from the arboreal ancestor; for the thoracic position is the one in which a climbing organism can most easily carry her young without loss of equilibrium, and in such an organism the reduction in the number of young produced at a birth is a necessary condition of persistence. Despite the apparent utter helplessness of the human infant at birth, it has been shown to possess the same tenacity of grip as the young anthropoid ape, which is capable of clinging to the long hair found on the chest and abdomen of the mother. There are indeed many



Mammoth Skeleton.

forded. They require a soil composed of sandy loam, finely-broken bricks, and lime rubbish.

Mammoth (*Elephas antiquus*), an extinct fossil elephant. It differs little in anatomical structure from existing members of the same genus, and, like them, was a large animal with a height of from nine to eleven feet. But it had a thick covering of dark-brown hair, and is known to have fed on the shoots of coniferous trees. Great numbers of mammoth skeletons have been unearthed in Europe, but chiefly in N. Siberia and on the Arctic coasts, where they have been preserved in the frozen soil. One seen by Adams in 1846 was so well preserved that its flesh was eaten by the natives, by their dogs, and by wild animals. Its stomach was opened, and was found to be filled with fine vegetable shoots. The tusks of the mammoth are sometimes more

Mammoth Tree. See SEQUOIA.

Manore, riv., Bolivia, S. America, generally considered as the head-stream of the Madeira. See AMAZONS and PERU.

Man is zoologically a member of the order Primates, and is most nearly related to the anthropoid apes (family Simiidae). The distinguishing features which justify the erection for him of a separate family—Hominidae—are chiefly the following. The brain-case and brain are proportionately much larger than in any anthropoid, while the facial portion of the skull is reduced in size, and is placed at a different angle to the brain-case, being below instead of in front of it. In the male sex in the European races the brain has an average weight of 1,360 grammes, while in the anthropoids the average weight is stated to be only 360 grammes. In man the teeth

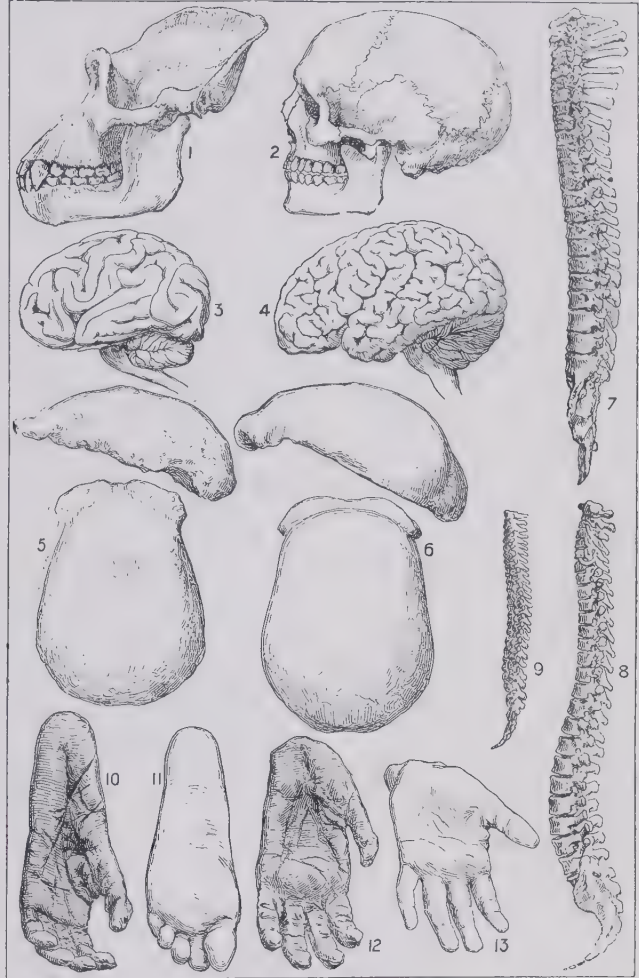
indications of close affinity with the anthropoid ape both in the human foetus before birth and in the infant at birth. Thus, the sole of the foot at birth is inturned, the vertebral column does not then display the characteristic curves, the foot possesses a power of prehension of which the later condition affords no trace, and so on.

In his five fingers and five toes, in his separate radius and ulna and tibia and fibula, in his clavicles, in the structure of his teeth, man is primitive in structure—still shows relation to the insectivore stock from which he is lineally developed. It is possible that the common ancestor of man and the large anthropoids was a form related to the living gibbons, but as yet there is no fossil evidence of the existence of such a form, and we have practically no knowledge of the pre-human ancestors of man. The recent discovery by Dubois in Java of a portion of a skull and a femur, believed to belong to a hitherto unknown form to which he gave the name of *Pithecanthropus erectus*, has as yet done little to bridge the gap in man's ancestry. In the absence of evidence of a direct kind, we can only reason from analogy as to the probable course of evolution. There have been many discussions as to which of the three distinctively human characters led the way. Some anthropologists emphasize the erect position as the important point, for this liberated the hands and made them the fit instruments of the developing brain. On the other hand, Professor Ranke suggests that it was the developing brain that made the upright position necessary, for it is the only attitude in which the head, made heavy by the increasing size of the brain, could be balanced on the vertebral column. If allowed to fall forward, the head would have hindered free respiration. Still other authorities, again, believe that it was the development of the social instinct which made for progress; for this, by protecting the young and weak, must have greatly accelerated variation. Anyway, it is the social instinct which has played the predominant part.

As to the date of origin of man nothing definite can be said. The first clear indications of his existence anywhere on the earth are found in the deposits of the Glacial Period. More than this: the remains found in beds of Glacial age in Europe (bones, tools, etc.), in Asia (tools, but not bones), in America (tools, bones), and in Africa (tools), all indicate a race at approximately the same stage of civilization, if it

may be so called. Much indirect evidence points to the Tertiary period, possibly the Miocene, as that of the origin of man, for in the strata of that era some geologists claim to have discovered traces of his existence. It was certainly in Upper Miocene times

is believed to be the Neanderthal or Spy type, which shows a number of pithecoïd characters, the forehead being low and retreating, the brow ridges prominent, and the stature apparently short; nevertheless the Spy man was definitely human, and in no sense



Man and Gorilla compared.

1. Skull of gorilla. 2. Skull of man. 3. Brain of gorilla. 4. Brain of man. 5. Skull of *Pithecanthropus erectus*, side and top view. 6. Neanderthal skull, side and top view. 7. Vertebral column of gorilla. 8. Vertebral column of man. 9. Vertebral column of child. 10. Foot of gorilla. 11. Foot of man. 12. Hand of gorilla. 13. Hand of man.

that the anthropoid stock began to undergo differentiation.

The men of the Glacial Period fall into two groups, according as their implements are rough and unpolished (Palæolithic type) or smooth and polished (Neolithic type). Of the Palæolithic skulls found in Europe, the oldest

a transitional form. In the development of man the social instinct, or more exactly the characteristic tendency to form social groups, must have had a double effect: in the first place, it must have accelerated variation; and in the second place, it must have tended to fix advantageous varia-

tions. As the variations which made for progress were less a matter of gross structural change than of brain development, and a wise utilization of experience, they became, as it were, the common property of the group, and tended to become more and more firmly fixed by the group life, in proportion as they gave the group an advantage in the struggle for existence. In the early stages it was the struggle with the physical and animal environment that was the dominant factor. Later, as Professor Karl Pearson points out, it was the struggle between rival groups which led to evolution. Man's supremacy over his non-human environment was, thanks to the solidarity of the group, secured at an early stage, and it was the pressure of surrounding groups which made for progress. Where, as in the case of the Australians and Tasmanians, a group has been isolated, there it may have remained for generations apparently stationary. But in such a case contact at a late stage with a much more highly specialized group leads, not to progress, but merely to elimination, as has already happened in the case of the Tasmanians.

As regards the races of men, there has been much discussion as to whether or not all are to be regarded as forming one species. The view that there is but one species is supported by the fact that the progeny of mixed marriages show no obvious diminution of fertility, as witness the numerous races of half-castes found in different parts of the globe. On the other hand, mixed unions of this type are only known between Europeans and native races, and there is virtually no evidence as to the fertility of the offspring of a union between individuals of two distinct non-European races—e.g. Hottentots and Malays. Nor can it even be said that the results of cross-breeding between Europeans and natives have been studied with scientific care.

As regards stature, the limits of normal variation appear to be from 1'35 metre to 1'90 metre, the average being about 1'65 metre (5 ft. 6 in.); but this average is obtained by leaving out of account exceptional cases, such as the Negroid Akka, whose stature is only 4 ft. 6 in., and it is, further, based on figures for males only. The difference in height between the two sexes varies from 3 in. to 5 in., the average being about 5 in.

The degree of pigmentation of skin, hair, and iris, when taken in conjunction with the characters of the hair, is of great importance in classification. Broca recog-

nizes no fewer than thirty-four shades of colour in the human skin, but it may be sufficient here to point out that these are all variants of the following four colours—white, yellow, brown, black (or dark-skinned). As regards the iris, the blue or gray eyes found in fair-skinned Europeans are the rarest shades, all other peoples having dark eyes. The chief types of hair are the straight (e.g. that of Chinese), the wavy (common in Europeans), the frizzy (Australians), and the woolly (as in negroes). Other very important characters in classification are the shape of the skull and the form of the bones. In the article ETHNOLOGY will be found a summary classification of the races of man, based upon the above and some other characters.

Apart from the physical characters of man discussed above, there are certain universal social characteristics which must be mentioned. One of these is the love of ornament. Paradoxical as the statement may seem, it appears to be a well-established fact that ornament precedes dress, which is indeed derived from articles of adornment. Though some races go entirely unclothed, it is doubtful whether any are totally devoid of personal ornaments. Again, there is much evidence to show that all ornaments were originally of the nature of amulets or charms. Another widespread if not universal characteristic of man is the habit of domesticating animals. The earliest animal to be domesticated seems to have been the dog, which was tamed by Neolithic man, as it is also by the very primitive Australians. By the aid of his dogs primitive man is a hunter, but when to the dog are added domesticated ungulates—such as cattle, goats, the ass, and so forth—agriculture becomes possible. It is often said that there are three great stages in culture, man being first hunter; then, as he learns to domesticate ungulates, he becomes a nomad, following the natural migrations of his flocks; finally, with the use of draught animals, he becomes agriculturist, learning to fertilize the soil artificially. But this statement, as has been pointed out, is only partially true; for even the primitive Australians add to the spoils of the hunt fruit and roots collected by the women, whose 'digging sticks' are the prototypes of the hoe of civilization, and who display some acquaintance with the conditions of plant growth. From this stage it is but a step to the conditions found among the natives of Chota Nagpur in India, where

the men hunt, while the women cultivate clearings in the forest, which are abandoned for fresh ones as soon as the soil is exhausted. It is probably from a condition like this that divergence took place in the two directions of pastoral life and agriculture in the strict sense.

Man. ISLE OF, in the Irish Sea, is 33 m. in length and 10 m. in breadth. High, rugged cliffs border the coast, pierced in several places by caves. A double or triple range of hills stretches south-westward through the island (Snaefell, 2,030 ft.). Nearly two-thirds of the surface is under cultivation. Argentiferous lead is worked. The climate is remarkably equable, the annual range of temperature being only 17°1, as compared with 23°5 at Brighton. Myrtles, fuchsias, and other exotics flourish out of doors all the year round. There is a breed of tailless cats. The island is a much-frequented holiday resort. The principal towns are Douglas (the capital), Ramsey, Castletown, and Peel. Near St. John's is Tynwald Hill, formerly the seat of the Supreme Court. The island is rich in stone circles, sepulchral mounds, runic and other crosses; possesses Rushen Castle, a well-preserved mediæval fortress, and Peel Castle, formerly used as a state prison. It was known to the Romans as Mona, and repeatedly raided by Norsemen. In 1266 Scottish supremacy replaced Norwegian, but in 1290 the islanders placed themselves under English influence. In 1406 Sir John Stanley was granted the island, with the title of king. In 1765 the Duke and Duchess of Athole, who then held the island, agreed to alienate the sovereignty to the British crown for £70,000 and an annuity of £2,000. Their remaining claims were ceded in 1829 for a further sum of £416,000. The administration is vested in a lieutenant-governor representing the King, a council, and the elected House of Keys (twenty-four members). The episcopal designation is Sodor (Norse, *Sudreyr* = 'Southern') and Man. The Manx language, now almost extinct, is a dialect of the Celtic. Public revenue (1903-4), £85,535; expenditure, £74,187; public debt, £255,352. Area, 227 sq. m. Pop. (1901) 54,758. See A. W. Moore's *A History of the Isle of Man* (2 vols. 1900), *The Constitution of the Isle of Man* (1882), Hall Caine's *The Little Man Island* (1894), *The Deemster* (1887), *The Manxman* (1894), and W. T. Radcliffe's *Ellan Vannin* (1895).

Manaar. See MANAR.

Manacor, tn., Majorca, Balearic Is., Spain, 30 m. by rail E. of Palma; contains a palace of the

ancient kings of Majorca, and is a bishop's see. Wine is exported. Pop. (1900) 12,408.

Managua. (1.) Lake in Nicaragua, Central America, 30 m. long by 16 m. wide, with an area of 438 sq. m., and is drained into the Lake of Nicaragua (23 ft. lower), 4 m. distant. Steamers ply on it. (2.) City, s. of the above lake, cap. of republic of Nicaragua since 1851. Pop. 30,000.

Manahiki. See MANIHIKI.

Manakin, the name given to a family (Pipridæ) of passerine birds, which range from Mexico to Brazil and the Argentine. They are mostly small, thick-set birds, inhabiting forests, where they flit about the branches after the fashion of tits. Their diet consists of fruit and seeds, mingled

Palk Strait, from which it is separated by the islands of Manar and Rameswaram and the reef known as Adam's Bridge. The gulf is famous for its pearl fisheries.

Manasarowar (Tibetan, *Tso-mapham*), sacred lake of S.W. Tibet, 15,285 ft. above sea-level, in the valley of the Brahmaputra, in 81½° E. long. Its area is over 150 sq. m. To the N.W. is the sacred mountain of Kailas.

Manasseh, the elder son of Joseph, who, however, received from his father a blessing inferior to that of his brother Ephraim (Gen. 48). The tribe of Manasseh had settlements on both sides of the Jordan.

Manasseh Ben-Israel (1604-57), Jewish theologian and

muzzle, with a very mobile upper lip, minute eyes, and a finely wrinkled skin, covered with very delicate hairs. The fore limbs



Manatee.

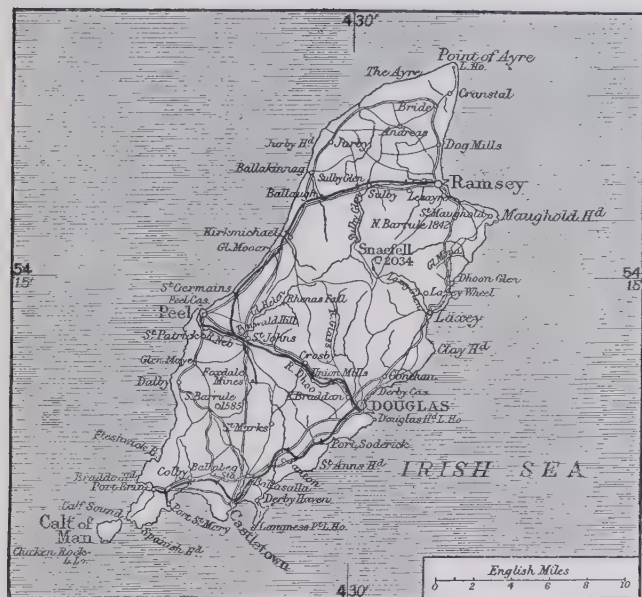
form paddles, as in the dugong, but except in one species, they bear three minute nails near their extremities. There is very free movement at shoulder, elbow, and wrist. The special peculiarity of the manatee is found in the cleft upper lip, the parts of which have been compared in their manner of action to the mandibles of a caterpillar. Other peculiarities are the presence of only six vertebrae in the neck, the rudimentary nature of the incisor teeth, and the numerous (eleven) cheek teeth, which have square crowns with transverse ridges. Only about six of these teeth are in use at one time, and they are moved forward and shed when worn, much as in the elephant. Manatees are hunted for their oil and hides. They are easily tamed. Only one young one is born at a time.

Manbhum, dist., Chota Nagpur, div. of Bengal, India, with an area of 4,147 sq. m., and a population (1901) of 1,301,364. Coal is mined. The capital is Purulia.

Manby, GEORGE WILLIAM (1765-1854), English inventor, born at Denver, Norfolk. He invented a life-saving apparatus for shipwrecks, tried at Yarmouth (1808), for which he received grants from Parliament. He also gave his attention to lifeboats, and to life-saving apparatus for fires and for ice accidents.

Mancha, LA, dist. s. of New Castile, Spain, now included in provs. of Albacete and Ciudad Real. It produces a light red wine called Val de Penas, and is noted for its mules. Don Quixote and Sancho Panza belonged to this district.

Manche, maritime dep., N.W. France. The N.E. coast is low, and the w. shore inhospitable, the only harbour being Granville. Around the Bay of St. Michel, to the s. of Granville, is a marshy tract. The peninsula of Cotenin forms the N. part of the department. To the N. is the deep bay of Cherbourg. Hemp, fruit, beetroot, and cereals are cultivated. Cider is manufactured. Area, 2,289 sq. m. Pop. (1901) 491,372. Cap. St. Lô.



Isle of Man.

with insects. Examples are *Pipra velutina*, which is black with a blue cap; and *Ceratopipra cornuta*, which is black, with scarlet head, neck, and thighs. There are in all some seventy species.

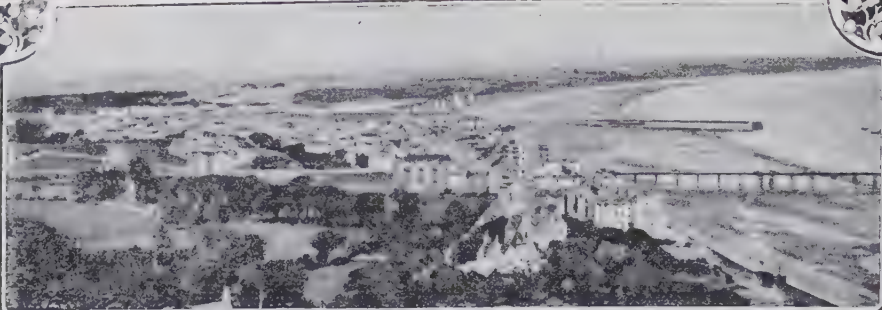
Manaoag, tn., prov. Pangasinan, Luzon, Philippines, 16 m. E. of Lingayen. Pop. 17,500.

Manaos, cap., prov. Amazonas, Brazil, near confluence of Rio Negro with Amazons. It is a fine town, with modern equipments. India-rubber, Brazil nuts, copaiba oil, and cocoa are exported. Pop. 40,000.

Manar, or MANAAR, GULF OF, inlet of Indian Ocean between Ceylon and India, nearly 150 m. wide. It narrows to the N. into

scholar, born in Lisbon; founded a Hebrew printing-press at Amsterdam (1626). He sought to gain admission for the Jews into England in the time of Cromwell (1655). Manasseh published *Spes Israelis* (1650), *Vindicie Judæorum* (1656), and *De Creatione* (1635).

Manatee (*Manatus*), one of the sea-sons or sirenians. It occurs on both sides of the Atlantic, never voluntarily leaving the water, and never going far from the shore. Like the dugongs, manatees are purely vegetarian in diet. A full-grown manatee is about eight feet long, and has a somewhat fishlike body, with a broad, flattened tail, a blunt



Scenes in the Isle of Man.

1. Ramsey. 2. Tynwald Hill and St. John's Church. 3. Kirk Braddan. 4. Laxey Wheel. 5. Peel Castle. 6. Douglas.
(Photos by Frith.)

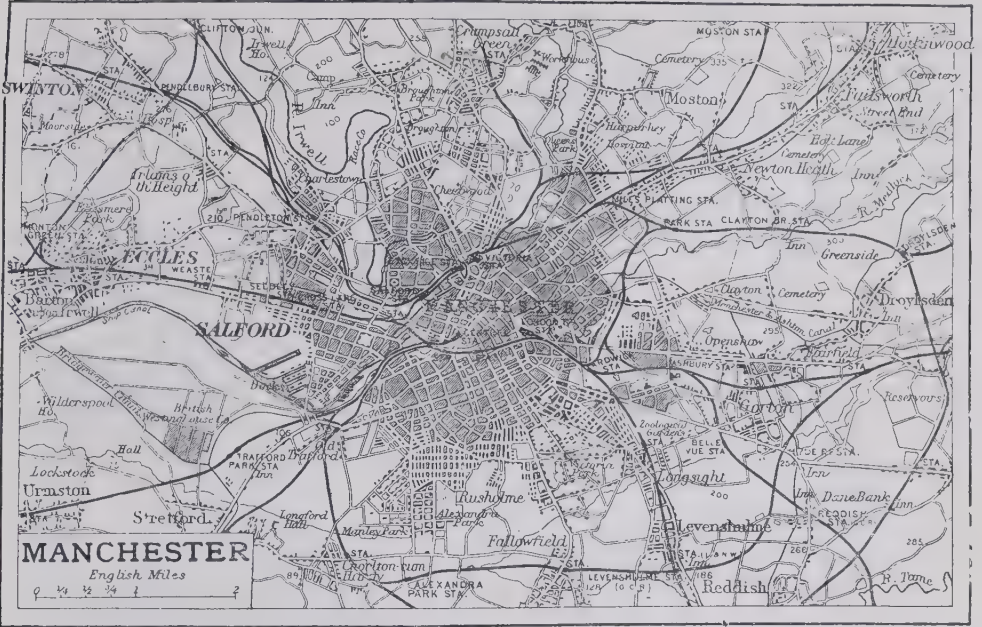
Manchester, par. and munic. bor., city (lord mayor since 1893), co. bor., the seat of a bishopric since 1847, and of a university since 1880, in Lancashire, England, 183 m. N.W. of London. It has access for sea-going vessels by means of the Manchester Ship Canal, opened in 1894. Manchester is essentially a modern town. It is chiefly engaged in the spinning and weaving of cotton, and in the bleaching, printing, and making up of 'Manchester goods.' There are also a vast number of engineering works. The shipping houses of Manchester export cottons, silk and woollen goods, steam, gas, and electrical machinery, chemicals, india-rubber, iron, steel, and copper goods.

grammar school, and the Manchester high school for girls. The art gallery contains a noteworthy collection of pictures. The town hall (1877) is one of the finest in the kingdom, and contains decorated panels by Madox Brown. The Free Trade Hall was erected on the site of the Peterloo massacre in 1856, to commemorate the victory of the Anti-Corn Law League; it is here the Hallé concerts are given. The city returns six members to the House of Commons. Pop. (1901) 543,969.

MANCHESTER COLLEGE was founded in Manchester in 1786, and removed to Oxford in 1893. It exists for the purpose of promoting the study of philosophy,

of St. Anselm's College. Pop. (1900) 56,987. (3.) City, Virginia, U.S.A., at the falls of James R., opposite Richmond. It has coal-mining. Pop. (1900) 9,715.

Manchester, EDWARD MONTAGU, SECOND EARL OF (1602-71), accompanied Prince Charles (II.) to Spain. When the civil war broke out he was given command of the troops in the eastern counties, and gained the battles of Marston Moor and Newbury; but showing great slackness in following up victories, he was by Cromwell's influence removed from the command. He strongly opposed the trial of the king and the establishment of the commonwealth, and took an active part in the restoration of Charles II.



The water supply of Manchester is derived from Lake Thirlmere in Cumberland. Few English towns are better supplied with public parks, the latest acquisition being Heaton Park, 693 acres in extent. Manchester was the first town in England to adopt the Free Libraries Act. The Chetham Library was founded in 1653 by Humphrey Chetham. Mention should also be made of the Christie Library at Owens College, and of the John Rylands Library, which includes the Althorp Library. The city possesses an excellent school of technology, school of art, the Manchester grammar school (founded in 1515), the Hulme

theology, and religion, without insisting upon the adoption of particular doctrines, and all members of Oxford University may attend the lectures without fees. See Axon's *Annals of Manchester* (1886), Saintsbury's *Manchester* (1887), and Shaw's *Manchester, Old and New* (1896).

Manchester. (1.) Town, Hartford co., Connecticut, U.S.A., 8 m. E. of Hartford; manufactures paper, woollens, silk, cotton, and needles. Pop. (1900) 10,601. (2.) City, New Hampshire, U.S.A., co. seat of Hillsboro co., on the Merrimack, 15 m. S. of Concord. It manufactures cotton cloth, fire-engines, locomotives, paper, and woollen goods. It is the seat

Manchester Guardian, THE, was established in 1821 as a weekly newspaper by John Edward Taylor, an active advocate of reform, the agitation which sprang up as a consequence of the Peterloo massacres being the inspiring motive of the *Guardian's* founder. It was edited for many years by Jeremiah Garnett, and Archibald Prentice was one of the principal writers on political subjects. Cobden also advocated in the *Guardian* his anti-corn law theories. In 1855, the date of the repeal of the newspaper stamp, the *Guardian* first appeared as a daily newspaper. Its price was at first twopence, but that was speedily changed to a penny. In



Views in Manchester.

- 1 Cathedral. 2 Rylands Library, interior. 3. Town Hall. 4. Art Gallery and Athenaeum. 5. Market Street. 6. Free Trade Hall. 7. Technical School. 8. Whitworth Hall and Owens College (Victoria University). 9. Royal Exchange.

(Photos by R. Banks.)

1872 Mr. C. P. Scott became editor, and later partner with his cousin John Edward Taylor, second son of the founder. Mr. Taylor died in 1905.

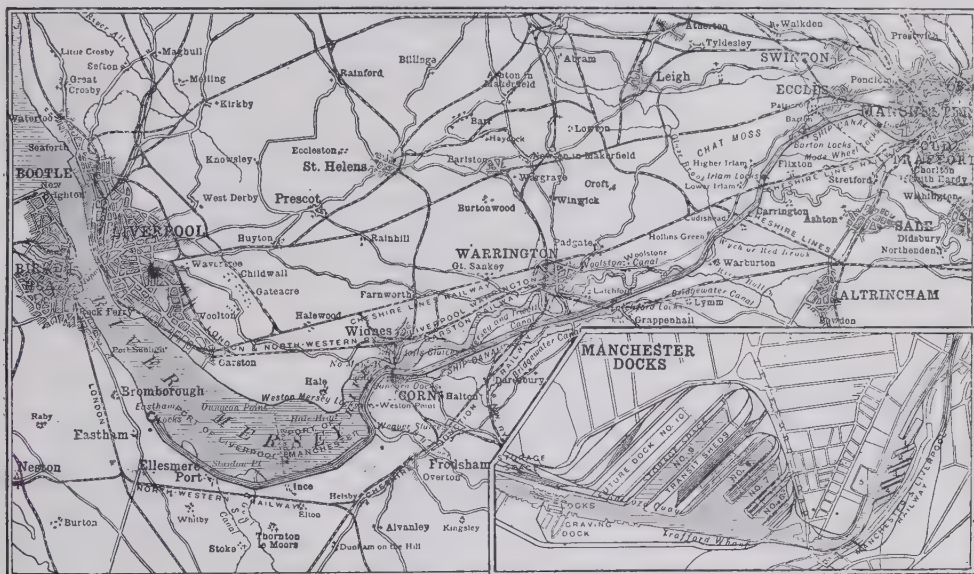
Manchester Ship Canal. This canal was begun in 1887, and was opened for traffic on Jan. 1, 1894. It starts from Eastham, on the left bank of the Mersey estuary, about four miles above Birkenhead. At the entrance there are three parallel locks of different sizes, and when the water of the Mersey is at the same level as the water in the canal the lock gates stand open. For the first fifteen miles from Eastham to Runcorn the canal skirts the Mersey, from which it is separated by a massive sea-wall. At Runcorn it leaves

opened the new dock (No. 9) at Manchester, the area of which is 15½ acres, and the depth 28 ft. For the half-year to June 1905 the available profit amounted to £102,970.

Machineel, a tropical tree, *Hippomane Mancinella*, belonging to the order Euphorbiaceæ, which yields a poisonous milky juice. It bears small flowers in May, followed by glossy, yellowish-green berries. It is easily grown in a peaty soil in stove temperature.

Manchuria, country lying N.E. of China proper. Area, 363,000 sq. m., divided into three provinces: (1) Feng-tien, or Hsing-Ching, in the S.—cap. Mukden (Manchu name), or Shên-

In Mukden the lowest reading in winter is about -28°, and the highest in summer about 96°. From December till the end of March the country is ice-bound. Heavy rains occur during July and August, which make traffic impossible, except by river. The soil is very rich. The most important cereal is tall millet, the staple food of the peasantry. Other crops are barley and wheat, rice, buck-wheat, beans (from which come bean-cake and bean-oil—the chief exports of the country), hemp, opium, tobacco, ginseng, potatoes, cabbage, melons, grapes, and hardy fruit. Silks, furs, skins, and pigs' bristles are among the most valuable animal products. It was originally the home of the



Manchester Ship Canal.

the estuary and strikes up the valley of the Irwell. The next locks are at Latchford, eight miles farther up; and between that and Manchester are three sets of locks, in all giving a total rise above sea-level of about 72 ft. The canal has a breadth of 172 ft. at surface and 120 ft. at bottom, and a depth of 26 ft., which is now being increased to 28 ft. The engineering difficulties were great. Railway lines had to be diverted and their levels changed, rivers carried under the canal by means of inverted siphons, and the Bridgewater Canal carried over the ship canal by means of a large swing aqueduct. There is extensive dock accommodation at Manchester, Salford, Warrington, and elsewhere. In July 1905 the King

Yang (Chinese name; (2) Kirin—cap. Kirin, or Chuen-chang; and (3) Hei-lung-chiang, in the N.—cap. Tsitsihar. The province of Feng-tien is divided by a range of hills starting in the S. of the Liao-tung peninsula and running N.E. to Kirin. It is well watered by the Liao, Hun, and Tai-tzu rivers, all navigable by junk in summer. At Yentai, 10 m. N.E. of Liao-yang, coal is mined. Kirin, the central province, is crossed by the Sungari, Hurka, and Ussuri rivers. The mountain ranges on the W. (the Great and Little Khingan) are mostly volcanic. Agriculture is confined to the river valleys, especially those of the Nonni and Hulan. Gold is found in the N.W. The climate of Manchuria is extreme.

Manchus; at the present time ninety per cent. of the population are Chinese immigrants. Manchuria was occupied by the Russians at the time of the Boxer outbreak (1900), and though it should have been evacuated under the terms of the Manchurian Convention (April 2, 1902), it remained under Russian control. This was the cause of the Russo-Japanese war, which ended in the Russian evacuation of the country. (See RUSSO-JAPANESE WAR.) Prior to the Russian occupation, Port Arthur was China's greatest naval station in the N. The chief manufactures are bean-cake and bean-oil, silk, vermicelli, indigo, and *sam-shu* (a native spirit). The exports through Newchwang amounted in 1904 to £1,741,000,

and the imports to £4,205,000. There are two railways: (1) The Chinese Eastern Ry.—a continuation of the Russian Transsiberian Ry. from Port Arthur to Kharbin (600 m.), thence from Kharbin w. to Transbaikalia (1,200 m.), and from Vladivostok E. to Kharbin (600 m.); (2) the Imperial Chinese

man, born at Castel Baronia (Avellino). As minister of justice, in 1876 he promoted the freedom of the press, the repeal of imprisonment for debt, and the abolition of ecclesiastical tithes. As foreign secretary (1881) he negotiated the Triple Alliance, and inaugurated Italian colonial

scriptures are written in an Aramaic dialect. The principal of these is the *Sidra Rabbā*, or 'The Great-Book,' in which are related three total destructions of the human race by fire and water, pestilence and sword, only two persons in each case surviving. The great god of the Mandæans is 'Primal Life,' from whom emanate the 'Second Life' and the 'Messenger of Life,' the Christ of the Mandæans.

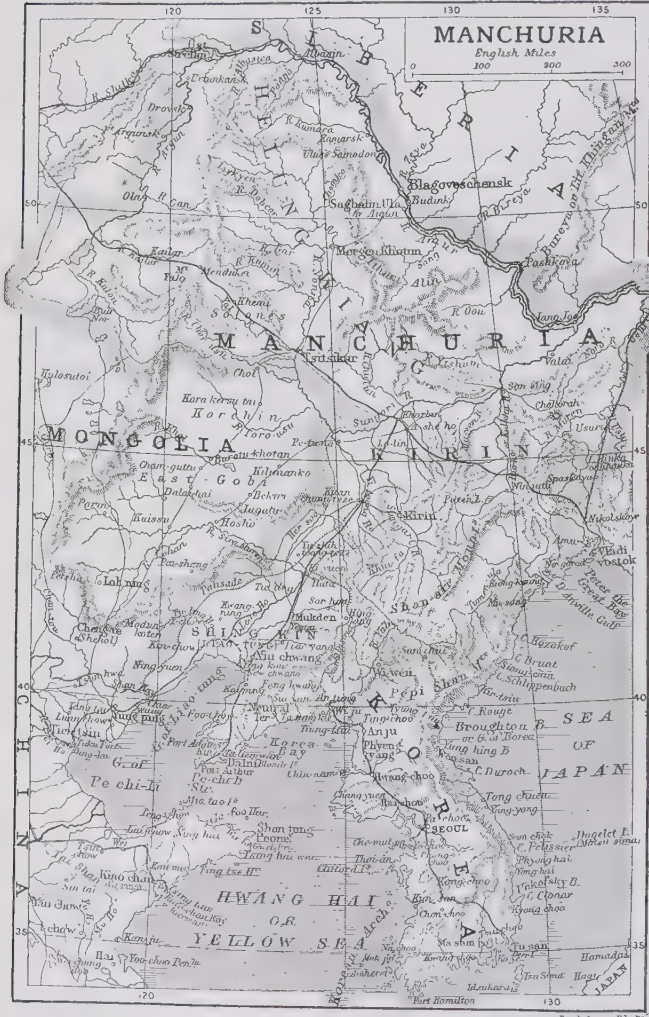
Mandalay, cap. of Upper Burma, on l. bk. of Irawadi, 400 m. N. of Rangoon. The original town is a square encompassed by a wall. Its gates are surmounted by curious wooden towers, and in the centre of the town is the picturesque palace of former kings of Burma. It has a famous pagoda containing an image of Buddha that attracts thousands of pilgrims. Silk-weaving is the chief industry. Pop. (1901) 166,154.

Mandamus. This is a prerogative writ granted by the King's Bench Division of the High Court to enforce the performance of a legal duty when there is no other remedy. It is generally addressed to public bodies or courts of inferior jurisdiction. A *mandamus nisi* is first issued, ordering the party to show cause why the *mandamus* should not be made absolute. See Shortt and Mello's *Practice on the Crown Side* (1890), and Shortt's *Information, Mandamus, and Prohibitions* (1887).

Mandarin, general term applied by Europeans to Chinese government officials, civil or military. Their rank is indicated by the colours of the buttons on their caps. Those of the two highest orders (governors and generals) display buttons of red coral; the third order (lieutenant-governors, provincial judges, etc.), clear blue; the fourth order (prefects), lapis lazuli; the fifth order, crystal; the sixth order, white; and the seventh, eighth, and ninth orders, gilt or yellow buttons. The robes of civil authorities are embroidered with birds, and those of military authorities with beasts. Admission to mandarin rank, and promotion therein, are regulated by state examination.

Mandarin Duck (*Anas galericulata*), a handsome bird found in E. Asia, which possesses a neck-ruff of chestnut feathers, a curious 'fan' or 'sail' of chestnut and black feathers, and a brightly tinted crest. The female is soberly coloured.

Mandarin Orange (*Citrus nobilis*), a species of orange, with smaller fruit than most other species, which has long been prized in China, and is now valued in Europe as well. It has a distinct subtle flavour.



Ry.—a continuation of the Shan-hai-kuan line to the w. of Mukden. Pop. 17 to 20 millions. See *The Long White Mountain*, by James (1888); *Manchuria: Its People, Resources, and Recent History*, by Alexander Hosie (1901); *The Story of the Manchuria Mission*, by Mrs. Duncan M'Laren (1896).
Mancini, PASQUALE STANISLAO (1817–88), Italian jurist and states-

policy by the expedition to Mes-sowah.
Mandæans, or **SABIANs**, an Oriental sect whose religion is compounded of Christian, heathen, and Jewish elements, somewhat resembling the worship of the ancient Gnostics. They occupy a portion of Mesopotamia, and although their language is either Arabic or Persian, their



Scenes in Manchuria.

1. Gateway, Kirin. 2. Town of Kirin. 3. Taitenwan Bay. 4. Tsitsihar. 5. Triumphant Arches, Tsitsihar. 6. Dalai: in the foreground a prominent Chinese Merchant decorated by the Russian Government. (Photo by the Keystone View Co.) 7. Manchurian Belles, Kharbin. 8. On the Amur River. 9. Near Liao-yang.

Mandate. In Roman and Scots law a mandate is a contract by which one person obliges himself to do some act for another person or to manage his affairs gratuitously. A reward may, however, be given in the form of a honorarium. The mandatory must use reasonable diligence, such as he would employ in his own affairs. See Green's *Law Encyclopædia*, vol. viii. (1898).

Mandaue, tn., Cebu, Philippines, on E. coast, 4 m. N.E. of Cebu. Pop. 15,000.

Mandevilla, a genus of tropical climbing shrubs, belonging to the order Apocynaceae. They bear simple racemes of mostly red or yellow, funnel-shaped flowers. The only species cultivated in Britain is *M. suaveolens*, bearing sweet-scented white flowers in great profusion. It likes plenty of root-room and a fairly rich fibrous loam containing peat.

Mandeville, EARLS OF ESSEX. See ESSEX.

Mandeville, BERNARD DE (†1670-1733), Dutch colonial writer, was a native of Dordrecht; settled in London about 1692, and practised medicine there until his death. He is the author of *The Fable of the Bees* (1714), a professedly ethical work, which in reality was a *jeu d'esprit* founded on the paradox that 'private vices are public benefits,' and that a nation's prosperity is advanced by individual greed and luxury. It is partly in verse, partly in prose, and combined, in the 1714 edition, *The Grumbling Hive* (1705), *Remarks* on this, and *An Inquiry into the Origin of Moral Virtue* (1714). In a later edition (1723) he added *A Search into the Origin of Society*.

Mandeville, SIR JOHN, the accredited name of the author of a notable book of travels, published in French during the latter half of the 14th century. The real author is supposed to have been one Jean de Burgoyne, who died in Liège (1372), where he settled (1343) as a physician, being also astrologer, naturalist, and philosopher. The greater part of the book is borrowed from the *Epistle of Prester John*, the works of Friar Odoric, Vincent de Beauvais, Friar Carpini, and others. There is an edition by G. F. Warner (1889).

Mandi, feudatory state, Punjab, India. Area, 1,131 sq. m. Pop. (1901) 174,045. Mandi, the chief town, is on the Beas, 45 m. N.W. of Simla. Pop. (1901) 8,144.

Mandible, a term used to designate the lower jaw of vertebrates, and also the toothlike appendages of the mouth in insects, crustaceans, and allied animals.

Mandingans, African people, in W. Sudan, where they form the bulk of the population between the Upper Niger and the Atlantic. Some, such as the Veis of the seaboard, are pure negroes and pagans; but the great majority are a blend of negro, Berber, and Arab elements. These have long been semi-civilized Mohammedans, who founded the powerful mediæval empires of Mali and Guiné, and the more recent kingdoms of Massina, Bambara, and Kong. All speak dialects of the Mande stock language. Total population estimated at over 10,000,000.

Mandla, chief tn., dist. of same name, Central Provinces, India, on Narbada R., 30 m. S.W. of Mhow. Area of dist., 5,056 sq. m. Pop. (1901)—tn., 5,428; dist., 317,250.

Mandogarah, or MANDU, tn., now deserted, in Dhar state, Central India, ancient cap. of the Mohammedan kingdom of Malwa; was founded about 313 A.D. Among its ruins is the great mosque, one of the finest specimens of Afghan architecture in India.



Mandoline.

Mandoline, a musical stringed instrument which may be termed a small form of lute. The variety best known is the Neapolitan, which has eight strings tuned in four pairs of unisons to the same fifths as the violin, and set in vibration by means of a plectrum. The compass of the instrument is about three octaves.

Mandrake, or MANDRAGORA, a genus of hardy herbaceous plants, natives of S. Europe. They bear small pale-coloured flowers, followed by globose, apple-like fruits. They have thick roots, and generally sinuate-margined leaves. *M. vernalis*, or devil's apple, bears its leaves in early spring, and its flowers soon after. *M. autumnalis* is supposed to be the mandrake referred to in Genesis in connection with Leah and Rachel. It bears its wrinkled bristly leaves in autumn, and soon afterwards its violet-coloured flowers, much like those of the passion flower. The mandrakes are easily grown in any deep, light soil, not too fully

exposed to sunshine. From very early times the mandrake has been superstitiously invested with all kinds of evil powers.

Mandrel, an iron rod used as a core round which something may be bent cylindrically—e.g. the revolving shaft which carries the chuck of a lathe.

Mandrill (*Cynocephalus mormon*), one of the largest of the baboons, and a native of the west coast of Africa. The canine teeth are of enormous size; the cheeks are naked, and striped with brilliant colours; while the ischial callosities are of great size and bright red colour.

Mandsaur, or MANDESUR, tn., native state of Gwalior, Central India, 106 m. N.W. of Indore. The treaty which concluded the Maratha-Pindari war was signed here in 1818. It has a trade in opium. Pop. (1901) 20,936.

Manduria, tn., prov. Lecce, Apulia, Italy, 22 m. S.E. of Taranto; has a celebrated well. Its ancient walls are still standing. Pop. (1901) 13,190.

Mandvi, seapt. on the S. of peninsula of Cutch, India, 36 m. S.W. of Bhuj. Pop. (1901) 24,683.

Manes, the name given to the spirits of the dead by the ancient Romans. See LARES.

Manet, EDOUARD (1832-83), French realistic painter, whose study of the quiver of light on objects in the open air paved the way for the later impressionists. He was born at Paris, and studied under Courbet, concerned solely with 'the veritable art of the thing seen.' The novel, realistic treatment of his *Olympia* (in the Luxembourg, Paris), which reveals his endeavour to give purity of outline, awoke bitter hostility. His influence was deep and lasting on the development of French art. See Bazire's *E. Manet* (1894).

Manetho, an Egyptian priest and historian, who flourished in the third century B.C. He wrote in Greek two great works, one on the religion and theology of the Egyptians, the other on their history; only fragments exist of either. Best edition by Unger, in *Chronologie des Manetho* (1867).

Manettia, a genus of tropical, evergreen, climbing plants belonging to the order Rubiaceae. They bear white, red, or blue infundibuliform flowers, and are useful plants for greenhouse pillars or trellises, a light, peaty soil being that most suitable.

Manfred (c. 1231-66), king of Sicily, where he was born, natural son of the Emperor Frederick II.; reigned from 1258. Excommunicated (1259) by Pope Alexander IV., Manfred with his Saracens overran Tuscany, and won the battle of Monte Aperto (1260), and subsequently met at Benevento (1266) Charles of Anjou,

brother of Louis IX. of France, to whom Pope Urban IV. had offered the crown of Sicily. Manfred fell in the battle.

Manfredonia, seapt., prov. Foggia, Apulia, Italy, 23 m. N.E. of Foggia, on the Gulf of Manfredonia. The town was founded in 1263 by Manfred, king of Sicily. It has an old castle and a cathedral. Figs and almonds are exported. Pop. (1901) 11,549.

Mangaldan, tn., Luzon, Philippines, on s. shore of Gulf of Lingayen, 13 m. N.E. of Lingayen. Pop. (1896) 16,143.

Mangaldas, SIR MATHOOBHAI (1832-90), Bombay merchant, who took great interest in Hindu education and social reform. He gave away enormous sums in charity, and bequeathed a large amount to found scholarships for Bombay graduates, to enable them to study in Europe.

Mangalore, seapt., municipality, and military station, dist. of S. Kanara, on the w. shore of Madras, India, 127 m. N.W. of Calicut. The roadstead is open; export trade with Arabia and the Persian Gulf. The town is the headquarters of the Basel Lutheran mission in India. Weaving, printing, binding, and tile manufacture are the chief industries. It has a Roman Catholic bishop and an ecclesiastical college. Pop. (1901) 44,108.

Mangan, JAMES CLARENCE (1893-49), Irish poet, was born in Dublin. He ranks high among Irish poets, there being fine spirit and quality in his verse. He also wrote *German Anthology* (1845), and *The Poets and Poetry of Munster* (1849). An edition of his *Poems*, by D. J. O'Donoghue, appeared in 1903. See *Life* by M'Call (1887).

Manganese, Mn 55.0, is a metallic element principally found as pyrolusite (black oxide of manganese, MnO₂). The metal is obtained by reducing the oxide with aluminium, and resembles iron, but is harder and very brittle, has a reddish tinge, and is more easily soluble in acids. Its specific gravity is 7.4, and it melts at 1,245° C. Pure manganese is used in the manufacture of very hard steel, and to alloy with copper, brass, and nickel. Whilst alloyed with iron as ferromanganese and spiegel-eisen, it is largely used in the preparation of mild steel. The compounds of manganese are extremely varied, for it unites with oxygen to no less than five different degrees. The manganous salts, derived from MnO, represent the lowest stage of oxidation. They are pink, well crystallized, and soluble in water, and are precipitated by ammonium sulphide and alkalis. Manganese dioxide, MnO₂, is the source of manganese and all its

derivatives. It is a black solid with feeble basic properties, forming unstable salts: that given by hydrochloric acid, MnCl₄, decomposes on heating, and yields chlorine, a process by which chlorine is largely prepared on the commercial scale. Manganese dioxide is also employed to improve the colour of glass and as a depolarizer in the Léclanché and dry cell. The higher oxidation derivatives of manganese—viz. manganic and permanganic acids—are best known in their alkali salts. The manganates are green, and are converted into permanganates by the action of acids. Sodium and potassium permanganate have a deep purple colour and powerful oxidizing action, which is made use of in analysis and for disinfecting purposes.

Mange. See DOGS—Diseases of.

Mangel-wurzel, an agricultural root introduced into Britain by Thomas Boothby Parkins in 1786. It belongs to the Chenopodiaceæ or goose-foot order, and is described botanically as *Beta maritima*. It is closely allied to both garden beet and sugar beet, and in the wild form is indigenous to the British Isles. There are several cultivated varieties, distinguished by the size and colour of the root; they are usually described as long red, red globe, long yellow, and yellow or orange globe. In the following properties mangel-wurzel is superior to turnips and swedes: it keeps sound and good for twelve months; it resists drought, and rather prefers a hot and dry season; it produces a heavy crop per acre; it will thrive on land that is too strong for turnips; it is very useful in late spring and throughout summer. On the other hand, it requires liberal manuring, and is more expensive to cultivate. It must be lifted before frost. As a food, it contains a higher percentage of dry matter than either turnips or swedes; and it is rich in sugar, which increases in value by keeping. Fifteen loads of farmyard manure and 2 cwt. of sodium nitrate to the acre on good land should produce forty to fifty tons per acre, though more have been grown. The seed should be drilled in rows, 18 in. apart, about the third week in April, and the crop lifted in October.

Manghishlak, region of Transcaspian prov., Russian Central Asia, bounded E. by Khiva, and W. by Caspian. Area, 60,000 sq. m.; pop. 150,000, mostly Kirghiz. Capital, Fort Alexandrovsk.

Manglaur, tn., Saharanpur dist., United Provinces, India, 48 m. N. by E. of Meerut. Pop. (1901) 10,763.

Mangnall, RICHMAL (1769-1820), English schoolmistress, born probably at Manchester;

educated at Crofton Hall, near Wakefield, Yorkshire, where she became a teacher, and ultimately schoolmistress. She is chiefly remembered for her *Historical and Miscellaneous Questions for Young People* (1800), a *Compendium of Geography* (1815), and *Half an Hour's Lounge, or Poems* (1805).

Mangonel, an engine formerly used in war for battering down walls and hurling missiles. It was worked by counterpoise, and possessed great accuracy in aim.

Mangosteen, the fruit of a tropical evergreen tree, *Garcinia mangostana*, belonging to the order Guttifera. The tree is a native of the Straits Settlements, and its round fruit is wonderfully delicious in flavour.

Mango Tree (*Mangifera indica*), an East Indian evergreen tree of the order Anacardiaceæ, growing almost 60 ft. high, and bearing in summer panicles of yellow-streaked white flowers, followed by kidney-shaped, red-and-yellow fruit. It is sometimes cultivated as a stove plant in Britain, and requires a fairly rich compost containing peat.

Mangrove, or RHIZOPHORA, a genus of tropical trees belonging to the order Rhizophoraceæ. It grows in swampy ground, and gradually reclaims land from the ocean's edge, both by the advance of its roots and by the habit of the seeds, which germinate whilst still attached to the parent tree, the young trees ready formed with roots and branches dropping in the water in advance of the parent stems.

Manhattan Island. See NEW YORK.

Mani. See MANICHÆISM.

Manichæism, a dualistic system of religion which originated in Persia in the early 4th century. Its originator was one Mani, or Cubricus, who was born in Babylonia c. 216 A.D. Professing to have been the recipient of supernatural revelations, Mani travelled extensively in the East, even to India and China. He won the recognition of the Emperor Shapur, exercised considerable influence under Hormizd I., and was finally put to death by crucifixion and laying by Bahram I. He composed the *Book of Secrets*, the *Book of Precepts for Hearers* (or *Epistola Fundamenti*), and the *Book of Making Alive* (or *The-saurus Vitæ*). His teaching is founded on the dualism characteristic of Persian speculation, and is indeed only a materialization of it. The spirits of light send upon the earth a succession of prophets, Noah, Abraham, Zoroaster, Buddha, and Jesus *patibilis*, who is pure spirit, his body being but a phantom (Docetism); while Mani himself, the last pro-

duct of the divine element, comes to carry on the work of Jesus and Paul—viz, the separation of light from darkness. His followers are the elect or the initiated, who shall at the destruction of the world enter the perfectly pure kingdom of light. They meanwhile purify themselves by abstinence from the world, even from touch, so far as possible. Manichæism is a syncretism of Persian and Christian ideas, and Buddhist elements are not wanting; its practice of baptism reveals a connection also with the Mogtasilah, who are represented by the modern Mandæans. It made great progress in its native region, its chief centre being Babylon, and later Samarkand; and it came into notice in the West about the time of Diocletian. In spite of persecution the sect spread rapidly, especially after the reign of Constantine; was prominent in N. Africa in the age of Augustine; and lasted well into the middle ages, exercising an influence on the Bogomiles, the Catharists, and other schismatic groups. See F. C. Baur's *Das Manichäische System* (1831); Geyler's *Manichæismus u. Buddhismus* (1875); Flügel's *Mani's Lehre u. Schriften* (1862); and fragments of Mani's writings in the *Bib. Græca* of Fabricius, vii. 323 ff.

Manifest, or **SHIP'S MANIFEST**, a document signed by the master, owner, or agent of a ship at the place of lading, and lodged with the proper customs officer. It must give a description of the vessel, crew, passengers (if any), ports of destination, and a full account of all the cargo, with marks, descriptions, consignors' names, etc.; if for a foreign port, the coal or fuel for use on the voyage must also be stated.

Manihiki, or **PENRHYN**, group of twelve coral islands in Pacific, N. of Society Is.; annexed (1888) by Great Britain, and including Caroline or Thornton I., Manihiki, Penrhyn, and Suwarrow. Included in New Zealand, 1901. Area, over 50 sq. m. Pop. 1,700.

Manihot, a genus of American shrubs and herbaceous plants belonging to the order Euphorbiaceæ. The roots of *M. utilissima* and *M. Aipi* are the sources of cassava meal and tapioca. See CASSAVA.

Manikaland, country of S. Africa, divided between Portuguese E. Africa and Rhodesia (Mashonaland). The railway from Beira to Fort Salisbury runs through it. The country is noted for its gold fields.

Manila, cap. and chief port of the Philippines, on w. coast of island of Luzon, at the mouth of the river Pasig, and at the head of a large bay affording excellent anchorage. Under Spanish rule

it was largely dominated by the religious orders, and its architectural features were heavy and sombre. It is an archiepiscopal see, and possesses a cathedral and a university. Manila is now the naval base of the United States in the Far East. Pop. (1901) 244,732.

Manila Bay, **BATTLE OF**. During the Spanish-American war of 1898, a Spanish squadron in Manila Bay, under Admiral Montijo, was destroyed on May 1 by a United States squadron under Commodore George Dewey.

Manilius, two Romans of note. (1.) **GAIUS MANILIUS**, tribune in 66 B.C., who proposed the Manilian law which gave Pompey full command in the Mithridatic war. Cicero delivered a speech, *Pro Lege Manilia*, in support of this law. (2.) **MARCUS or GAIUS MANILIUS**, a Roman poet, who lived most probably in the Augustan age. He is known solely by his poem *Astronomica*. Editions: Bentley (1739), R. Ellis's *Noctes Maniliane* (1891).

Manilla Hemp, or **ABACA**, a name given to the fibre obtained from a plantain (*Musa textilis*) common in the Philippines. It is exported in large quantities, and used like true hemp for cordage, sail-cloth, and other fabrics. See **HEMP**.

Manin, **DANIELE** (1804-57), Italian patriot, was born at Venice. From 1831 he became a leader of liberal opinion in Venice, and was imprisoned; but the outbreak of 1848 set him at liberty, and he was made head of the Venetian republic, and is counted as the last doge. He organized the defence against the Austrians for five months.

Maning, **FREDERICK EDWARD** (1812-83), Irishman, who became a naturalized Maori, having settled at Onaki, New Zealand (1833). Maning rendered services to both sides during the war (1845-61), and was appointed one of the judges for settling land-titles (1865). He wrote *Old New Zealand* (1863) and *The History of the War . . . in 1845* (1876).

Manioc. See CASSAVA.

Manipur, or **IMPHAL**. (1.) Feudatory state of Assam, India, between Assam and Upper Burma. Area, 8,300 sq. m. It consists mainly of an extensive valley; its products are tea, cotton, rice, tobacco, opium, and indigo. It has been under British control since 1825; in 1891 some British officials were treacherously murdered, necessitating a punitive expedition. Pop. (1901) 284,465. (2.) Capital of above state, 226 m. N.W. of Mandalay. Pop. (1901) 67,093.

Manis. See PANGOLIN.

Manissa, tn., Asia Minor, on l. bk. of Gediz-chai, 21 m. N.E. of

Smyrna by rail. It contains the palace of Kara Osman Oglu. Manufactures cotton goods. At one time it was noted for lodestone. Pop. 38,000.

Manistee, city, Michigan, U.S.A., co. seat of Manistee co., 100 m. N. of Grand Rapids. It produces chiefly salt and lumber. Pop. (1900) 14,260.

Manitoba, prov., Dominion of Canada, bounded s. by United States, and E. by Ontario. Area, 73,956 sq. m., chiefly of the finest agricultural land. Its surface is flat, and is traversed by the Assiniboine, the Souris, the Pembina, the Red River, and the Winnipeg. There are several large lakes—e.g. Winnipeg (8,500 sq. m.), Winnipegosis (1,936 sq. m.), and Manitoba (1,900 sq. m.). The climate is liable to extremes of heat and cold, and is severe in winter, the mercury falling at times as low as 50° below zero. Fine wheat is grown, and cattle-raising is carried on. Pop. (1901) 254,947. The people are largely Presbyterians. The province is represented at Ottawa by four senators and ten members of the House of Commons. This province has undertaken the construction of a railway from Winnipeg to Hudson Bay. The construction of the transcontinental route practically created the province, and the N. Pacific has direct connection with Winnipeg and Brandon. Down to 1868 Manitoba formed part of the territory controlled by the Hudson's Bay Company, and the province of Manitoba was constructed in 1870. It was in it that the two Riel rebellions broke out, in 1869-70 and in 1885. It was in Manitoba that Lord Selkirk's Red River Colony was settled (1812).

Manitoba Lake, Canada, situated 60 m. S.W. of Lake Winnipeg, into which it is drained by the Little Saskatchewan. Its length is about 120 m., and its breadth 25 m. Area, 1,900 sq. m.

Manitou, the great spirit of the North American Indians, who figures in the legend of *Hiawatha*, as presented by Longfellow. But there are many manitous in the Indian pantheon. Every tribe and every clan has its own protecting god, and so also every individual. These gods or manitous are all animals, so that the manitou is the tribal or individual totem.

Manitou, tn., El Paso co., Colorado, U.S.A., 6 m. N.W. of Colorado Springs, in the midst of magnificent scenery, at the junction of three great cañons, and at the base of Pike's Peak. Hence it is a great summer resort. Near it is the famous 'Garden of the Gods.' Its mineral springs also attract visitors. Pop. 1,300.

Manitoulin, group of islands in Lake Huron. Except for Drummond I., which belongs to Michigan, they are Canadian. The largest is Grand Manitoulin, or Sacred Island, 90 m. long and from 5 m. to 30 m. broad. Many of the villages on the islands are summer resorts. Pop. 2,000.

Manitowoc, city, Wisconsin, U.S.A., co. seat of Manitowoc co., on Lake Michigan, 80 m. N. of Milwaukee. Pop. (1900) 11,786.

Manizales, tn., Antioquia, Co-

cause of the plebeians against the patricians; he was accused of treason and executed.

Manlius, TORQUATUS. See TORQUATUS.

Mann, HORACE (1796-1859), American educator, was born at Franklin, Massachusetts. During 1837-48 he was secretary of the Massachusetts Board of Education, and from 1853 until his death he was president of Antioch College, Ohio. He wrote *Lectures on Education* (1848);

organization of the dock labourers after the dock strike of 1889, and has since been secretary of the London Reform Union (1893), of the Independent Labour Party (1894), and of the National Democratic League. He was a member of the Royal Commission on Labour in 1892. His writings include *A Socialist's View of Religion* (1896), and *The Programme of the I.L.P. and the Unemployed* (1895).

Manna, a saccharine exudation from the stem of two deciduous



lombia, 72 m. s. of Medellin; exports gold, coffee, and cocoa. Pop. 20,000.

Mankato, city, Minnesota, U.S.A., co. seat of Blue Earth co., on Minnesota R., 85 m. s.w. of St. Paul. Pop. (1900) 10,599.

Manlius, MARCUS, was consul of Rome in 392 B.C. When the Gauls captured the city in 390, he took refuge in the Capitol, and one night, when the Gauls attempted to scale the rock, Manlius was awakened by the cackling of the sacred geese. Six years afterwards he upheld the

Report of an Educational Tour in Germany, Great Britain, and Ireland (1846); and *Letters and Speeches on Slavery* (1851). His works and biography are collected in 5 vols. by G. C. Mann (1867). See *Lives* by Mrs. Mann (1865; new ed. 1882), A. Winship (1896); B. A. Hinsdale's *Mann and the Common School Revival in the United States* (1898); G. A. Hubbell's *Horace Mann in Ohio* (1900).

Mann, TOM (1856), English labour leader and organizer, was born at Foleshill, Warwickshire. He took a leading part in the or-

trees, the flowering ash (*Fraxinus ornus*) and the round-leaved flowering ash (*F. rotundifolia*), natives of Calabria and S. Europe. These trees grow to twenty-five or thirty feet in height, and bear dense terminal panicles of whitish flowers. The manna is obtained in summer by making incisions in the bark. Flake manna is the form in which it is chiefly known in Britain. This consists of stalactiform pieces of a pale yellowish colour, with a faint, sickly smell and a sweet taste. The manna eaten by the

Israelites in the wilderness is generally considered to have been the saccharine exudation of a species of tamarisk (*Tamarix mannifera*), the sap being set flowing by an insect of the *Coccus* genus.

Mannargudi, tn., Tanjore dist., Madras, India, 24 m. E.S.E. of Tanjore; has a fine pagoda much resorted to by pilgrims. Pop. (1901) 20,449.

Manners. See **RUTLAND** and **GRANBY**.

Manners, CHARLES, stage name of Southcote Mansergh, managing director of the Moody Manners Opera Company; first appeared in the comic opera of *Claude Duval*, and created the part of Private Willis in *Iolanthe*. He has done much to promote popular interest in opera. Mr. Manners married Miss Fanny Moody, the English *prima donna*.

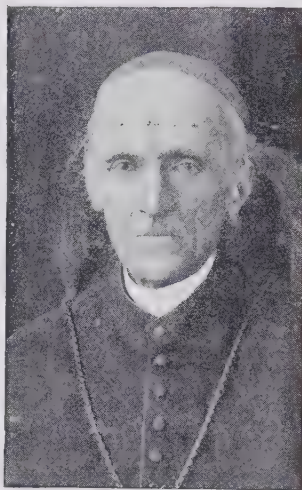
Mannheim, tn., grand-duchy of Baden, Germany, at the confluence of the Neckar with the Rhine, 39 m. by rail N. of Karlsruhe; one of the principal trading centres of S. Germany. Its industrial establishments include iron foundries, machine shops, sawmills, chemical, woollen, carpet, and glass works. A large palace, built in 1720-9, formerly the residence of the elector of the palatinate, faces the Rhine to the S.W. of the town. Founded at the beginning of the 17th century, Mannheim suffered severely during the Thirty Years' war, and was again destroyed in 1689 by the French. Pop. (1900) 141,131.

Manning, HENRY EDWARD (1808-92), English cardinal, was born at Totteridge, Hertfordshire. He was appointed rector of Woollavington, Sussex (1833), became famous for his eloquence, and upheld the Tractarian movement with vigour. He was appointed archdeacon of Chichester (1840), and for some time was a leader of the High Church party; but eventually he joined the Church of Rome, and was ordained priest (1851). He founded the Congregation of the Oblates of St. Charles, London (1857), became archbishop of Westminster (1865), and cardinal (1875). Manning strove to advance the education and social condition of the people. He wrote *The Temporal and the Internal Mission of the Holy Ghost* (1865), and *The Eternal Priesthood* (1883). See Manning's *Cardinal Manning* (1892); Maynell's *Memorials* (1892); and *Lives* by Gasquet (1895), Purcell (1896), and Rosmer (1896).

Manning, ROBERT. See **MANNING**.

Manning the Navy. Under the Plantagenets soldiers were commonly embarked to fight at sea; but by the reign of Elizabeth the navy was manned almost exclusively by sailors. From the

beginning of the 17th century, impressment had largely to be depended upon to supplement the volunteer seamen. The encouragement of seamen, however, was radically influenced by the passing of the Navigation Act (12 Car. II. c. 18) of 1661, which was only repealed in 1854. A few years after the passing of the act the bounty system was established; and it became customary to give six weeks' advance pay to men joining first and second rates, and one month's to those joining third rates. In 1705, when forty thousand seamen were needed for the fleet, justices of the peace were called upon to find seamen in their districts, and to hand them over to the press-gang; and in 1733 a proclamation offered a bounty of twenty shillings for an able sea-



Henry Edward Manning.

(Photo by Russell & Sons.)

man and fifteen shillings for a landsman. During the wars of the 18th century even outward bound merchant-ships were not exempt from the press, and jail-birds, ticket-of-leave men, and vagrants of all kinds were got hold of by various ways. In 1795 an act was passed by which each county had to furnish a certain 'quota of men.' But it was not until after the issue of the report of a Committee on Manning, in 1853, that the problem was finally solved by the adoption of continuous service.

Mannite, or **MANNITOL**, $C_6H_{14}(OH)_8$, the simplest of the hexahydric alcohols, occurs in many plants, particularly *Fraxinus ornus*, from the dried exudation of which, or manna, it is extracted by solution in alcohol and crystallization. It may be prepared

by reduction of dextrose or levulose with nascent hydrogen, and occurs in dextro-rotatory (the natural variety), levo-rotatory, and inactive forms, the latter obtained synthetically. Mannite forms colourless crystals that have a sweet taste and are soluble in water and alcohol. It can be oxidized to levulose, and on heating forms anhydrides.

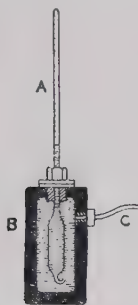
Manns, SIR AUGUSTUS (1825), musical conductor, born in Pomerania. After considerable experience in regimental bands and in Gungl's orchestra in Berlin, he became conductor and solo-violin at Kroll's Gardens, then bandmaster in a crack regiment at Königsberg, and finally (1855), conductor of the Crystal Palace Orchestra, London, which he raised to the highest pitch of excellence. He inaugurated the renowned Saturday concerts. In 1895 he resigned the conductorship, and was knighted in 1903.

Manning, ROBERT (?1260-1340?), English poet, commonly known as Robert of Brunne, was born at Brunne or Bourne in Lincolnshire, and was a canon of the Gilbertine order of Sempringham. In 1303, under the title of *Handlyng Synne*, he translated, with additions, the *Manuel des Pechiez* of William of Waddington, illustrated with rude tales. Between 1327 and 1338 he produced a rhymed *Chronicle*, the first part of which is a pretty close translation of Wace, the second a translation of Piers of Langtoft. The *Handlyng Synne* was edited by F. J. Furnival for the Roxburghe Club (1862).

Manœuvres are those military exercises, on a more or less large scale, which complete the course of instruction of troops in peace by imitating as far as possible the circumstances of war. The German successes in the Franco-German struggle of 1870-1 drew attention to the importance of manœuvres and their especial value in the training of officers, and all continental states now practise them every year. In Great Britain something is done, but nothing like enough. In India, however, there are annual camps of exercise. In Germany, in addition to regimental, brigade, and divisional manœuvres, there are also special manœuvres on a larger scale, in which several army corps and cavalry divisions are assembled. The reserves are not called up for the annual manœuvres. In France the autumn manœuvres are carried out at the period when the reserves are called up to their corps. See **NAVAL MANŒUVRES**.

Man-of-War Bird, a term sometimes applied to the frigate bird, and also sometimes to the albatross and the skua.

Manometers are instruments for measuring liquid or gaseous pressures. In general they act on one of three principles: the pressure in question is balanced against either (1) the hydrostatic pressure of a column of liquid, (2) the pressure of a gas, or (3) the force required to deform a spring or raise a weight. In the first class the pressure exerted is proportional to the product of the height into the density of the liquid balanced; and in metric units, pressure in gm. per sq. cm. = ht. in cm. \times density. Manometers of this type, as a rule, give the difference of pressure above or below that of the atmosphere; the liquid being exposed on the one hand to the unknown pressure, and on the other to the atmosphere, and they require a reading of the barometer to get the true pressure. This difficulty may be got over by closing one end of the tube and exhausting it of air,



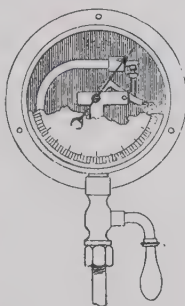
Air Manometer for high pressure.

A, Thick-walled glass tube; B, iron cylinder filled with mercury; C, flexible connection.

when the true pressure is at once obtained from the difference of levels, as in the mercurial barometer. In the second class, which are capable of dealing with greater pressures without becoming cumbrous, the pressure is set to compress a gas enclosed in a tube by an intervening column of liquid, usually mercury. The pressure exerted is, in terms of Boyle's law, inversely as the volume to which the gas is compressed; or if V is the volume at a known pressure P , such as that of the atmosphere, and V' the volume at the unknown pressure P' , then $P' = P \times \frac{V}{V'}$.

This type of instrument is particularly useful in experiments on the compressibility and critical point of gases; but allowance may have to be made for any deviations which the gas used in the manometer may exhibit from Boyle's law, and for any difference of level of the confining liquid that may be set up. Manometers of the third class, in

which, as a rule, a spring is deformed, are the ones most used for commercial purposes—e.g. as steam and vacuum gauges. A good type is that of the Bourdon pres-



Bourdon Pressure-gauge.

sure-gauge, in which a curved tube of elliptical section tends to straighten itself as its section becomes rounder when subject to internal pressure. This straightening is magnified and transmitted by suitable mechanism to a hand moving over a dial. Such instruments require to be calibrated by comparison, eventually, with a manometer of one of the other classes, and are not capable of such a high and permanent degree of accuracy, as the elasticity of the spring is not perfect or permanent. This is evident in the aneroid barometer, which is a manometer of this class. See Ostwald's *Physico-chemical Measurements* (trans. Walker, 1894).

Manor. A manor is, in English law, an estate in fee simple in a tract of land granted by the sovereign to a subject in consideration of some service. The subject in turn grants portions of the estate to others, who hold of him a process known as subinfeudation. The creation of new manors has become impossible since the statute of *Quia Emptores* (1289). A manor usually includes a manor-house with demesne lands, freehold tenements, copyhold tenements originally carved out of the demesne lands; waste and common of the manor; a court baron, of which the freeholders are the judges; and a customary court baron, of which the lord or his steward is the judge. The chief officer of a manor is the steward, who transacts on behalf of the lord the legal business of the manor, and receives the customary fees. Inside the manor all questions are determined by reference to custom, and the laws of inheritance and the like are often quite different from the common laws. A manor becomes extinguished if it ceases to have two freehold tenants. See also COPYHOLD,

HERIOT; and Scriven *On Copyholds* and Vinogradoff's *The Growth of the Manor* (1905).

Manresa, city, prov. Barcelona, N.E. Spain, 30 m. n.w. of Barcelona. It is an ancient Roman city (*Minorisa*), and famous for its heroic defence (1808-11). Here is the cave of St. Ignatius, where Loyola saw his visions. There are manufactures of cotton, woollen yarns, and silk goods. Pop. (1900) 23,225.

Manrique, GOMEZ (? 1415-91), Spanish poet, many of whose best works were rediscovered in 1885, and published by Paz y Melia in 1886. His contemporary fame rested mainly on his didactic verse in the Italianate style of Juan de Meña and the Marquis de Santillana, his uncle. The best are *Requimiento de Principes*, *Consejos a Diego Arias*, and *Prosección de los Vicios y Virtudes*. He also wrote a sacred and a secular play, which are among the first true dramas in the Spanish language.

Manrique, JORGE (1440-78), Spanish poet, nephew of Gomez Manrique, wrote a set of elegiac couplets on the death of his father, which rank amongst the great poems of the world. Longfellow has translated (1833) them into English. The poet was killed in the civil war under Isabel the Catholic.

Mans, LE. tn., cap. of Sarthe dep., France, on riv. Sarthe, 30 m. S.E. of Alençon. The cathedral contains the tomb of Berengaria, queen of Richard, Cœur de Lion. The principal manufactures comprise ironmongery, machines, clocks and watches, linen goods, and chemicals, especially sulphuric acid. The town was the birthplace of Henry II. of England, and the scene of a battle in 1793 between the French republican troops and the Vendean forces. On Jan. 10-12, 1871, Chanzy was defeated by the Germans under Prince Frederick Charles. Pop., including its suburb Pré (1901), 63,272.

Mansard Roof, ascribed to the French architect François Mansart (1598-1666), is composed of two superimposed planes on each side, the lower two being the steeper. It thus enlarges the attic space in the interior.

Manse, legally the dwelling-house of the minister of the Established Church in Scotland in a landward (i.e. rural) parish, or a parish that is partly landward and partly burghal. Originally the term manse was applied to the piece of land set apart for the clergyman, which is now called 'the glebe.' The manse must be built and repaired by the heritors or landed proprietors of the parish. An incumbent is entitled to have a manse put in

proper repair on entry, and it may then be declared a 'free manse,' and the incumbent will then be liable for ordinary repairs for fifteen years. Two acts of 1824 (5 Geo. IV. c. 72 and c. 90) make provision for relieving poor parishes, and for building manses in the Highlands and Islands.

Mansel, HENRY LONGUEVILLE (1820-71), English metaphysician, was born at Cosgrove, Northamptonshire; elected reader on moral and metaphysical theology at Oxford (1855); appointed Bampton lecturer (1858), professor of ecclesiastical history (1866), and dean of St. Paul's (1868). In metaphysics Mansel followed Sir William Hamilton in maintaining the relativity and conditioned nature of knowledge. His chief publications were *Prolegomena Logica* (1851), *Mansel's Conception of Eternity* (1854), *On the Philosophy of Kant* (1856), *Bampton Lectures* (1858, 1859, and 1867), and *The Gnostic Heresies* (1874).

Mansergh, JAMES (1834-1905), English civil engineer, was born at Lancaster. He began his professional career on railway work, but is best known by his sewerage, drainage, and water-works schemes, including the Elan Valley water scheme for Birmingham, opened by the King in 1904.

Mansfield, PETER ERNST, COUNT (1517-1604), imperialist soldier, who, during the war which followed the revolt of the United Provinces from Spain, proved himself one of the most successful of the generals on the Spanish side, and was for a short time entrusted with the government of the Spanish Netherlands.

His illegitimate son, **COUNT PETER ERNST** (1580-1626), was even more famous as a military leader. He served first the king of Spain in the Netherlands, then the emperor in Hungary, but received no adequate recognition of his services. Thereupon he became a Protestant (1610), and was engaged in war in Bohemia and in the Rhine provinces on behalf of the Count Palatine, and in 1622 inflicted a crushing defeat on Tilly at Wiesloch. In 1624 he raised an army with the aid of French and English subsidies, but was defeated by Wallenstein at Dessau in 1626. He raised another army, and marched into Hungary to join Bethlen Gabor, but died suddenly near Serajevo. It was he who set the fashion of freely quartering his troops upon the country they occupied, or of 'making the war itself support his troops.'

Mansfield. (1.) Municipal bor., Nottinghamshire, England, 14 m. N. of Nottingham, has ironfounding and coal-mining, and the manufacture of hosiery, lace

thread, and boots. Frame-knitting has declined. Courts for the Forest of Sherwood were held here till 1715. Pop. (1901) 21,441. (2.) City, Ohio, U.S.A., co. seat of Richland co., 70 m. s.w. of Cleveland. It manufactures agricultural implements. Pop. (1900) 17,640.

Mansfield, WILLIAM MURRAY, EARL OF (1705-93), British judge, was born at Perth, and became solicitor-general in 1743, and attorney-general in 1754. He was created chief-justice in 1756, but still remained a member of the cabinet. This anomalous position, and the fact that his political opinions were of a reactionary character, created a popular dislike against him, and his house was burned down during the Gordon riots (1780). He resigned the chief-justiceship in 1788.

Mansfield College, Oxford, England, is a non-residential theological college, founded in 1886 and opened 1889, for the education principally of nonconformist ministers. Mansfield House, in Canning Town, London, E., is a settlement in connection with the college.

Mansion House, London, the official residence of the lord mayor, built in 1739, contains a large banqueting hall, a fine picture-gallery, and many curiosities. The building is situated in the centre of the city, close to the Royal Exchange. Funds are collected at the Mansion House for distribution among sufferers from war, pestilence, floods, and other misfortunes.

Manslaughter. Manslaughter is the unlawful killing of another without malice aforethought. Manslaughter is either (1) voluntary, or (2) involuntary. (1.) Voluntary, as when, upon a sudden quarrel, two persons fight and one kills the other, or when a man greatly provokes another by some personal violence and the other immediately kills him. The act causing death must be done at once, otherwise the homicide would be a deliberate act of revenge, and therefore murder. (See also SELF-DEFENCE.) (2.) Involuntary, when the death, not being directly intended, is caused in the commission of an unlawful act, or even a practical joke, not amounting to a felony, or by the culpable neglect of a duty imposed upon the accused—e.g. negligent driving or gross negligence by a doctor. Manslaughter is a felony, and is punishable by penal servitude to the extent of life, or by imprisonment, or fine, or both. In Scotland manslaughter is called 'culpable homicide.'

Manson, GEORGE (1850-76), Scottish painter, born in Edinburgh; devoted himself to water-colour painting (1871). Some of

his best sketches were made in Sark (1874), in the Channel Islands. His pictures are refined in drawing and colour. See Gray's *George Manson*.

Mansûrah, cap., prov. Dakiyeh, Lower Egypt, near w. shore of Lake Menzaleh; a centre of the cotton industry, and makes also sail-cloth. Pop. (1897) 36,131.

Mant, RICHARD (1776-1848), bishop of Down, Ireland, was born at Southampton, and appointed bishop of Killaloe and Kilfenoragh (1820), being translated to Down and Connor (1823), with Dromore added (1842). Mant wrote an *Annotated Bible* (with D'Oyly, 1814), and *History of the Church of Ireland* (1840). See *Memoir* by Berens (1849).

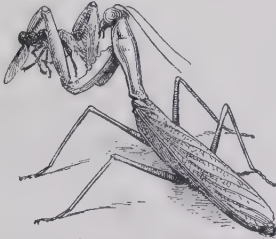
Mantegna, ANDREA (1431-1506), Italian painter and engraver, born at Vicenza. In him the epoch of art from the middle of the 15th to the early part of the 16th century in N. Italy found its highest expression, and is therefore commonly called the Mantegnesque. He was the pupil of Squarcione, and was influenced also by Donatello and Jacopo Bellini. Of his early paintings the most important are the Eremitani frescoes at Padua, the *Agony in the Garden* (National Gallery, London), and the triptych in the Uffizi Gallery, Florence. In 1466 he settled in Mantua as court painter to Lorenzo Gonzaga. Unfortunately, few remain of his magnificent frescoes in the ducal palace, and those executed for Pope Innocent VII. in Rome have been destroyed. To his later years belong the beautiful *Madonna della Vittoria* (Louvre); *The Triumph of Scipio*, painted in grisaille (National Gallery); and the fine *Triumph of Caesar* (Hampton Court), much injured by restoration. Mantegna's paintings are inspired with the spirit of revived antiquity, executed with extraordinary technical skill, realistic accuracy, and great energy. He portrayed a wide range of human emotions, from the unconscious simplicity of childhood to the tragic intensity of mature age. See *Andrea Mantegna*, by Maud Cruttwell (1901); *Mantegna and Francia*, by Julia Cartwright (Mrs. Ady), 1881; *History of Painting in North Italy*, by Crowe and Cavalcaselle (vol. i., 1870).

Mantell, GIDEON ALGERNON (1790-1852), English geologist, born at Lewes, Sussex, and practised medicine at Lewes, Brighton, and Clapham. He was the first to discover and describe the *Regnosaurus*, *Pelorosaurus*, *Hylæosaurus*, and *Iguanodon*. His chief works are *The Fossils of the South Downs* (1822), *The Wonders of Geology* (1838), and *The Medals of Creation* (1844).

Mantes (Rom. *Medunta*), tn., dep. Seine-et-Oise, France, on l. bk. of Seine, 30 m. N.W. of Paris. Its Gothic church of Notre Dame dates from the 12th century. The town has tanneries, saltpetre factories, and flourmills. Musical instruments and artificial incubators are manufactured. Large numbers of poultry are reared. Pop. (1901) 8,034.

Manteuffel, EDWIN HANS KARL, FREIHERR VON (1809-85), Prussian field-marshal, was born at Dresden, and entered the Prussian service in 1827. He precipitated the war over Schleswig-Holstein by marching his men into Holstein as a Prussian protest against the summoning of the estates (1866). He became commander-in-chief of the army of the Main, and defeated the Bavarians in various battles. When the Franco-German war broke out he succeeded in driving 30,000 French soldiers into Switzerland. Subsequently he became (1879) viceroy in Alsace-Lorraine.

Mantinea, city of Arcadia in ancient Greece. In 385 B.C. it was taken by the Spartans, and was deserted until after the battle of Leuctra, in 371. Again in 222 it was taken by the Achæan League, and its independence destroyed. Two great battles are known by its name: the first in 418 B.C., when the Spartans defeated the Argives, Arcadians, and Athenians; the second in 362 B.C., when the Thebans defeated the Spartans.



Mantis (Hierodula raptoria).

Mantis, generally the members of the insect family Mantidae, of which perhaps the most familiar member is the 'praying mantis' (*M. religiosa*) of Europe. Mantids are orthopterous insects, raptorial in habit, and most remarkable for the structure of the fore legs. These are large and strong, and, being armed with powerful spines, are admirably adapted for their natural function—that of catching the living insects upon which the animal feeds. Hardly less interesting, however, are the extraordinary forms often assumed by the insects. In not a few cases the limbs bear foliaceous expansions, which, when combined with the greenish colour of the body,

give the insects a peculiarly leaf-like appearance, and it is stated that many tropical forms exhibit a singularly detailed resemblance to flowers. Widely distributed over the warmer parts of the globe, mantids are entirely absent from colder regions, though twelve forms occur in the warmer parts of Europe.

Mantling. See HERALDRY.

Man-trap. It is an offence punishable with penal servitude for five years to set, or allow to be set, a man-trap or spring-gun (except in a dwelling-house for the protection thereof) with intent to harm trespassers or other persons. (1861, c. 100, s. 31; 1891, c. 69, s. 1.)

Mantras, in Hinduism, extracts from the Vedas. In the degraded form of Hinduism they are used as mysterious spells for the purpose of working magic or of averting evil.

Mantua (Ital. *Mantova*), city, cap. of prov. of same name, Lombardy, Italy, on the Mincio, 22 m. S.S.W. of Verona. The city is strongly fortified, the river, artificial lakes, and canals forming part of the scheme of defence. The water and the adjacent marshes render the town unhealthy. There are Renaissance churches, the most important being that of Sant' Andrea, and other buildings, such as the Corte Reale and the Palazzo del Tè, by Alberti and other famous architects; and the town possesses art treasures of Mantegna and Giulio Romano, both natives. It was the native town of Virgil, and there is a Virgilian academy. In addition to a theological institute, a botanical garden, observatory, and public library (80,000 vols.), there is a museum with Greek busts and sarcophagi. The city wears an air of gloomy decay. Pop. (1901) 30,194.

Manu, a mythical Brahman sage, supposed to have lived about five centuries before Christ. He is the reputed author of the code which bears his name, though it is clear that the book is the work of more than one man. The *Code of Manu*, which was elevated to the dignity of sacred literature long before it came to be adopted as the basis of Hindu jurisprudence, is a philosophical treatise on the religious and social obligations of the Aryan race.

Manures. All descriptions of refuse act as fertilizers—*e.g.* wool, hair, bones, flesh, blood, fish, seaweed, leaf-mould, and straw. Similarly, foods enrich the manure, on account of the residues which pass through the digestive system of the animals consuming them. Hence one approved method of improving land is to keep a large head of live stock, and feed them liberally with

purchased foods. It was only through the application of chemistry to agriculture that the true principles of manuring were brought to light, and the intimate connection between the soluble and insoluble salts which exist in fertile soils and the constituents composing the ash of plants was shown.

Artificial Manures.—As soon as it was discovered that the 'essence' of manures consisted of certain pure salts, it was clear that the water and purely carbonaceous matter that form the bulk of farmyard manure, and of refuse generally, were not of any true manurial value. They possess a mechanical value, but are not directly absorbed by growing plants. The roots of flowering plants feed exclusively upon pure salts. It has often been objected that artificial manures exhaust the soil by stimulating it to produce beyond its natural rate, but this objection is at best only a half-truth. The continued use of special manures, such as sodium nitrate or lime, do tend to exhaust soil, simply because they only supply one ingredient. The main fertilizers are phosphatic, potassic, calcareous, and nitrogenous, and of these the first and the last are most important.

The accompanying table, from Warington's *Chemistry of the Farm*, shows clearly the amounts of the various ingredients removed by ordinary crops from one acre of land.

Phosphatic Manures.—The original source of phosphoric acid in manures was bones, but mineral superphosphates have in a great measure taken their place. In 1883 a valuable source of phosphoric acid was discovered in basic slag, a by-product of the manufacture of Bessemer steel. It is actually the basic lining of the converter impregnated with the phosphoric acid which the lining abstracts from the fused ironstone at high temperatures. Basic slag contains from sixteen to twenty per cent. of phosphoric acid in the form of tetrabasic phosphate of lime, a compound which is easily decomposed in the soil. The basic slag is disintegrated into an impalpable powder, and applied directly to the land at the rate of 5 or 6 cwt. per acre. It produces the most marked effects upon clay-soil pastures deficient in lime, and may also be used as a manure for all crops on arable land.

Potassic Manures are seldom applied directly; but in cases where land is naturally deficient in this important element, kainit may be used with advantage. Kainit contains over thirty per cent. of potassium sulphate, and is obtained from the lower beds

of the Stassfurt salt mines in Germany. The usual dressing is 2 cwt. per acre.

Calcareous Manures.—Lime is useful in neutralizing free acid in the soil, and especially in combining with free nitric acid and forming calcium nitrate. It is applied in bulk in the form of chalk, hot or calcined lime, marl, and shell-sand. It forms an important element in basic slag, basic superphosphate, and ordinary superphosphate.

Nitrogenous Manures.—The best-known forms are sodium nitrate, ammonium sulphate, ammonium chloride, gas liquor, and Peruvian guano. They impart a dark, rich green to the foliage, and promote the growth of the herbaceous or strawy parts of plants. Nitrates speedily wash through the soil, and therefore concentrated nitrogenous manures are best applied during the time of active growth. A combination of mineral and

Minor, in which the skins of sheep were largely prepared for the purpose of manuscripts. In the earlier centuries schools or associations of scribes existed. To one of these schools at Alexandria we are indebted for the famous copy of the Scriptures known as the *Codex Alexandrinus*, written at the commencement of the 5th century, and now in the British Museum. In all the principal monasteries there was a *scriptorium*, or writing-room, in which the scribe was generally assisted by a *dictator*, who read aloud the text. The transcript was then revised by a corrector, and next handed over to a *miniator*, who added the ornamental work to the pages.

The oldest manuscript known is the *Papyrus Prisse*, in the Louvre at Paris, consisting of eighteen pages in Egyptian hieratic writing, ascribed to about B.C. 2500. The oldest Greek writing (not inscription) is on a

capitals, the uncial hand (meaning originally letters an inch long); next came the half-uncial, the Merovingian, the Carolingian minuscule, the Hiberno-Saxon, the Roman or continental, the angular Gothic, and the court hands.

In regard to illuminated manuscripts, in the 4th, 5th, and 6th centuries we find little ornamentation beyond the rubricated or gilded letters of the actual text. The 7th, 8th, and 9th witnessed the perfection of the Hibernian style; the 10th, 11th, and 12th, the introduction and use of architectural forms; the 13th, 14th, and 15th, the growth of foliage under carefully studied natural laws—the 13th century being the age of the bud, the 14th of the leaf, the 15th of the flower; and in the miniatures, the 13th the age of gold, the 14th of diaper, the 15th the commencement of realistic painting. In the 16th century manuscripts became

Ingredients removed from an Acre of Land by Ordinary Crops.

	Pure Ash—lbs.	Nitrogen—lbs.	Potash.	Lime.	Magnesia.	Phosphoric Acid.	Chlorine.	Silica.	Soda.	Sulphur.
Wheat, 30 bushels	31	33	9.7	1.0	3.7	14.3	0.2	0.5	0.9	2.7
Straw, about 28 cwt. .. .	158	12	18.2	9.2	4.0	8.4	1.7	110.6	2.5	5.1
Barley, 40 bushels .. .	46	35	9.8	1.3	4.0	16.2	0.4	12.0	1.0	2.9
Straw, about 22 cwt. .. .	100	12	21.6	8.5	2.5	4.4	3.2	51.5	4.2	3.2
Oats, 45 bushels .. .	54	38	8.5	2.0	3.9	11.8		24.8	1.4	3.2
Straw, about 26 cwt. .. .	140	14	29.6	9.8	5.3	7.1	5.5	69.3	5.9	4.8
Meadow Hay, 1½ tons .. .	208	49	56.3	28.1	10.1	12.7	16.2	57.5	11.9	5.7
Red Clover Hay, 2 tons .. .	255	102	87.4	86.1	30.9	25.1	9.4	6.8	4.1	9.4
Turnips and Leaves, 17 tons .. .	364	120	148.8	74.0	9.5	33.1	22.1	7.7	24.5	20.9
Mangels and Leaves, 22 tons .. .	690	147	262.5	53.3	46.9	49.1	90.4	25.0	140.6	14.0

nitrogenous manures always produces more effect *pro rata* than either applied separately. A complete manure, or one containing all the principal elements of plant nutrition, has been demonstrated to keep up the fertility of land even under such a trying ordeal as consecutive corn-growing, for fifty years in succession, at Rothamsted. See R. Warington's *Chemistry of the Farm* (15th ed. 1902).

Manuscripts. The earliest specimens of manuscripts occur upon stone, metals, wood, baked clay, wax, linen, the bark and leaves of trees, and the prepared skins of quadrupeds, such as goats, sheep, and calves. The present article is restricted to writings on vellum or parchment—i.e. manuscripts proper. Vellum is prepared from the skin of the calf, and the finest vellum manuscripts are prior to the 8th century. The word 'parchment' is said to be derived from Pergamus, a city of Asia

papyrus at Vienna, assigned to the period 280-70 B.C.; while the earliest Latin document is a wax tablet in the National Museum at Naples, clearly dated A.D. 55. Other famous manuscripts are the *Cottonian Genesis*, in the British Museum, the most ancient Greek Septuagint ms., probably written in the 4th century; the *Codex Sinaiticus*, the oldest of all the New Testament codexes, of date not later than A.D. 400; the *Book of Kells*, containing the four gospels in Latin, traditionally asserted to have belonged to Columba, and written apparently in the 7th century; Aleuin's Bible, written in the Carolingian minuscule hand; the *Anglo-Saxon Chronicle*; the manuscripts of *Beowulf* and *Cædmon*; and *St. Margaret's Gospel Book*, only recently discovered, and now in the Bodleian Library.

The earliest of Western manuscripts were written in Roman capitals; then followed rustic

merely costly appendages of luxury and taste. See *Books in Manuscript*, by F. Madan (1893), and Adler's *About Hebrew Manuscripts* (1905). See also INSCRIPTIONS, Papyrus.

Manutius Aldus, or MANUZIO ALDO (1449-1515), promoter of typography and classical scholarship, born at Bassiano, near Velletri; settled at Venice (1490), where he founded the Aldine Press and the Accademia Aldina, with Bembo, Navagero, Musurus, Chalcondylas, Erasmus, and other scholars as correspondents. There he published the Aldine editions of the classics, which for typography and accuracy have ever commanded the admiration of all bibliophiles. Many of them are of great variety, especially the *Horace* (1497), the *Virgil* (1501), and the *Rhetores Graeci* (1513). He invented the type called italics, once called Aldine, first used in printing his edition of *Virgil* (1501)—the first octavo book ever issued. He is

known as Aldus the Elder, to distinguish him from his son PAOLO (1490-1597), who continued the work, first in Venice, then at Rome under Pius IV. and Gregory XIII. See Renouard's *Annales de l'Imprimerie des Aldes* (1834).

Man in the Iron Mask. See IRON MASK.

Manzanares, city, prov. Ciudad Real, Spain, 27 m. E. of Ciudad Real. It contains an ancient castle. Pop. (1900) 11,229.

Manzanillo. (1.) Town, Cuba, between Trinidad and Santiago. It ships tobacco, sugar, wax, and honey. Pop. (1899) 14,464. (2.) M. ISLAND. See COLON.

Manzanita, a beautiful aromatic flowering shrub or small tree (*Arctostaphylos glauca*), the chief home of which is in the Sierra Nevada of California, at from 2,000 to 3,000 ft. The roots and knots are utilized as walking-sticks and as veneer. The wood is fine-grained, of a dark red or mahogany colour, but twisted and crooked in form. The manzanita thickets which clothe the Californian hillsides, are laden in spring time with white and rose-coloured blossoms.

Manzoni, ALESSANDRO (1785-1873), Italian writer and chief of the romantic movement in Italy, was born at Milan. His *Inni Sacri* (1815) testify both to his faith and to his espousal of the new literary theories. The *Cinque Maggio* (1822), a fine ode, inspired by the death of Napoleon, aroused general admiration. Two tragedies, the *Conte di Carmagnola* (1820) and the *Adelchi* (1822), mark a further severance from classical models. The great historical novel, *I Promessi Sposi* (1827; best critical ed. by Petrocchi, 1893-1902), written on the model of Scott's works, depicts the state of Lombardy about 1630. It has retained its extraordinary popularity by reason of its perfect manner, the skill with which history and fiction are intermingled, and the profound interest of the story. Three English versions have appeared—1828, 1834, and 1844. See monographs by Carcano (1873), Bersezio (1873), Prina (1874), De Gubernatis (1879), Cantu (1885), Stampa (1885), Petrocchi (1886), Waille (1890), Key (1894), Bellezza (1898), Beltrami (1898), and Fabris (1901).

Maoris, aborigines of New Zealand. They are of the Polynesian race, their nearest kin being the Rarotongans of the Cook archipelago; but in physical and mental characters the Maoris differ in a marked degree from all the other members of the Polynesian family. The type, however, varies considerably—some being of a

light colour, with straight black hair and regular Polynesian features; others rather darky-brown, with curly or even frizzly hair, and the long, arched nose of the Papuan; while others display the dark complexion and coarser features of the New Caledonian Melanesians. Hence the inference that on their arrival they found the islands already occupied by a Melanesian race, whom they partly exterminated and partly assimilated; and this is entirely in accordance with their own traditions. From the native flax they wove and dyed clothes and mats, and lived together in strongly-fenced villages of well-built huts. Graceful designs were tattooed on the faces of the great chiefs, whose heads were afterwards embalmed. The Maori language boasts of a rich oral literature, abounding in songs, proverbs, legends, creative myths, and more or less trustworthy traditions. The Maoris have steadily declined in numbers from perhaps 100,000 in 1840 to 65,000 in 1856 and 43,000 in 1901. These are mainly confined to North Island, where they have made some progress in the European arts and embraced various forms of Protestant Christianity. See John White's *Ancient History of the Maori* (6 vols. 1889); Sir G. Grey's *Polynesian Mythology and Maori Legends* (1885); F. E. Manning's *Old New Zealand Pakeha-Maori* (1884).

Map, sometimes incorrectly MAPES, WALTER (c. 1140-c. 1209), a Welshman by origin, and probably a native of Hereford, was a clerk of the court of Henry II. He also acted as justice itinerant in England, and in 1179 he was present at the Lateran Council in Rome. He was also canon, precentor, and eventually chancellor of Lincoln. He was the author of Latin verse of a satirical character, and of a collection of historical reminiscences, court gossip, and legendary folklore (*De Nugis Curialium*). But his fame is mainly due to his supposed authorship of certain of the Arthurian prose romances. In fact, of all the Arthurian prose romance, two branches alone, the *Merlin* and the *Tristan*, have not been ascribed to Map. The fact that nowhere do we find Map, in the first person, claiming the authorship of an Arthurian romance, is a decided argument against such authorship, although it is not impossible that he may have been the author of an early version of the *Lancelot* story. See Hucher's *Grand S. Graal* (1875-8).

Maple (*Acer*), a genus of trees belonging to the order Aceraceae, and containing nearly a hundred species. They are natives of the

north temperate zone, and are specially abundant in N. America and Japan. They bear opposite, lobed or palmate leaves, and flowers in axillary racemes, followed by winged fruits. The two British species are *A. campestre* and *A. pseudo-platanus*, the former having erect and the latter pendulous racemes. Many varieties are cultivated for their beautifully tinted foliage. The wood has a satiny appearance, and is much used in finer cabinet work. From the sap of the American *A. saccharinum* large quantities of syrup and sugar are made by tapping the trees in early spring and collecting the sap.



Maple (*Acer campestre*)
1. Flower; 2. fruit.

Maps. A map is a representation of the earth, or a part of it, on a plane surface. The sheet is first covered with a network of parallels and meridians, the projection being chosen according to the extent and latitude of the continent or country to be represented, the scale, and the special purpose for which the map is intended. The chief points on the coast, the rivers, hills, etc., are generally determined by astronomical observations, trigonometrical and topographical surveys. In most cases the draughtsman has only to take his main outlines from an existing map by reducing it (if necessary) to the desired scale with the aid of a pantograph or by photography. When the rough traverse surveys of a traveller in unknown countries have to be mapped, the nearest accurately determined points are marked, and then the route and other observations of the traveller must be adjusted to them. In general maps on scales less than 1:200,000, only the



Types of Maoris.

1. Portrait of Wahine, Mata. 2. The chief Patarangukai. (Photos by Valentine.) 3. Wharepuni at Awahou Pah. 4. Maraera, a Maori belle. 5. Maggie, a Maori guide at Rotorua. 6. The Tohunga.

large indentations of the coastline can be shown, many small rivers and tributaries must be omitted, and towns will be indicated by dots or small circles; while on a map of one inch to the mile, every farmhouse will be marked, and the general form of the towns, with some of the principal streets, will appear; and again on large town plans every alley and pavement can be shown. Mountains and smaller elevations of the ground are treated in a variety of ways. On orographical maps of a small scale only a few contour lines are inserted, and the areas between these are coloured in shades; and the same method may be used on maps of a larger scale, the contour lines and shades being increased in number. Frequently contour lines alone are used. Again, the configuration of a country may be rendered conspicuous to the eye by means of hachures (*hachures*), which are drawn either horizontally or vertically; and different degrees of shade are produced by increasing the number or thickness of the hachures, and diminishing the distance between them. With these hachures two systems of illumination are used—the one in which the light is supposed to fall vertically, and the other in which the rays are supposed to make an angle of 45° with the vertical. In the former case level ground will be white, and the shade will increase with the steepness of the slopes; whereas in the latter slopes normal to the direction of the rays of light will be the lightest, and the flank of a hill turned from the light darker than the other. Several schemes of shading, regulating the number, thickness, etc., of the hachures have been devised. A more expeditious method is to use colour shading with one or the other of the above systems of illumination. Numerous conventional signs are used to indicate houses, bridges, roads, sand, rock, marshes, trees, etc.

Orographical maps show the elevation of a country with only sufficient of the general topography to mark the position of the ranges and peaks; political maps show kingdoms, principalities, states, counties, etc.; geological maps, the various rocks. Then there are statistical maps, showing density of population, productions of the land, industries, etc.; ethnographical maps, botanical and zoological maps, marine charts and sailing charts.

Maps are usually accompanied by a scale of miles, or the natural scale is noted—i.e. the ratio of a length on the map to the distance on the earth's surface that it represents. This scale can only be

used when the area represented is small, for on maps of large parts of the globe it is exact only on the central parallel or meridian. An approximate result may be obtained by counting the interval on a meridian or the equator in degrees, each of which is equal to sixty geographical miles. Areas can be measured on equal area maps with a piece of glass ruled in squares, or with a planimeter.

The earliest map of which there is any record was engraved on a copper plate by Anaximander of Miletus about B.C. 580. Of other cartographers of ancient times may be mentioned Dicaearchus, Posidonius, Hipparchus, Strabo, Marinus of Tyre, and, the greatest of all, Claudius Ptolemy. He endeavoured to fix the latitudes and longitudes of his chief points. During the middle ages maps were constructed without parallels and meridians, the outlines were very inaccurate, and many fanciful details were introduced. Some improvement was introduced by the invention of the compass, which led to the construction of compass maps. With the dawn of the age of discovery, cartography revived, and mathematicians, following the example of Ptolemy, devised new methods of projection. Whereas the maps of the ancients were constructed by distances, points were now fixed as far as possible by astronomical observations. By the end of the 18th century most of the important European countries were mapped. The British ordnance survey was established in 1784, and in almost all European countries, in the United States, India, etc., surveying and map-construction are now executed by special state departments, with great accuracy and fullness of detail. For the best maps of the countries of the world, Mr. J. G. Bartholomew's articles on 'The Mapping of the World' in the *S.G.M.*, vols. vi. and vii., may be consulted, which are accompanied by maps showing the relative values of geographical surveys. See PROJECTION.

Maqui (*Aristotelia Maqui*), an evergreen Chilean shrub belonging to the order Tiliaceæ. From the berries the natives make a febrifuge. It can be grown in the open against a south wall in the warmer parts of Britain.

Mar, old dist., Aberdeenshire, Scotland, between the rivers Dee and Don, and comprising Braemar, Cromar, and Midmar. It gives title to the Earl of Mar.

Mar, EARLS OF, trace their descent in the female line to Grathney, Earl of Mar, married to a sister of King Robert I.; and in the male line to Henry de Erskine or Areskine, proprietor of that barony in Renfrewshire in the time of Alexander II. Be-

coming vested in the crown, the earldom was in 1562 bestowed by Queen Mary on her half-brother Lord James Stewart. He exchanged it, however, for the earldom of Moray; and in June 1565 John, sixth Lord Erskine (d. 1572), the heir of the old line, received a patent of the entire earldom of Mar. After Mary was sent to Lochleven, Mar was entrusted with the custody of the young king, and on the death of Lennox (1571) he was chosen regent. His son John, second earl, of the Erskine line (1558-1634), succeeded to the charge of the young king. He was one of the leaders in the overthrow of Arran in 1584. On account of his leading part in the rebellion of 1715, John, sixth Earl of Mar (1675-1732), was attainted; but the estates were purchased for his son by Lord Erskine of Grange. In 1824 the attainder was reversed, and on account of the failure of male issue in 1866, the earldom in 1875 was declared to belong to the Earl of Kellie; but on Aug. 6, 1885, the title was conferred on John Francis Erskine Goodeve Erskine, who had married Lady Frances Jemima Erskine, the nearest female heir of the old line. See Crawford's *Earldom of Mar* (2 vols. 1882).

Marabouts, a class of religious devotees in the north of Africa who were the mainstay of the Almoravid dynasty of Spain and Morocco. They acted as priests in the mosques and other holy places, and were credited with the powers of prophesying and performing miracles. They were the backbone of the opposition offered to the French conquest in Algeria in the middle of the 19th century.

Maracaibo. (1.) City, Venezuela, on an inlet of Maracaibo Lake. It exports coffee, hides, rubber, and asphalt. Pop. 35,000. (2.) GULF OF, or LAKE OF VENEZUELA, is bounded on the W. by Goajira peninsula. It is 12 m. wide at Maracaibo, but 75 m. broad farther S. (3.) LAKE, connected with above gulf by strait nearly 9 m. wide. It measures 100 m. from N. to S., and from 50 to 60 m. wide. The entrance is obstructed with shoals.

Maracci, LODOVICO (1612-1700), Italian Orientalist, born at Lucca; made a name by an edition of the Koran, with notes (1698), and a *Life of Mahomet*. He was professor of Arabic at Rome, and a favourite of Pope Innocent XI.

Maragha, or MARAGA, old city, Azerbaijan, Persia, 50 m. S. of Tabriz; contains the tomb of the Mongol sovereign Huliagu Khan, who erected on the adjacent mountain a celebrated observatory. In the neighbourhood are cave temples. Pop. 13,260.

Maragogipe, tn., Bahia, Brazil, on r. bk. of Paraguassu; with coffee, sugar, and tobacco factories. Pop. 15,000.

Marajo, or JOHANNES, isl. in the estuary of the Amazons and Para, N. coast of Brazil. Length, 165 m. (E. to W.); breadth, 120 m. In the wet season it is covered with water, and in the dry is clothed with grass.

Maramaros Sziget, tn., cap. of Maramaros co., Hungary, on Theiss R., and at the foot of Carpathians, 80 m. N.E. of Klausenburg. It has salt mines, saw-mills, and a trade in lumber. Pop. (1900) 16,901.

Maranhão. (1.) State in Brazil, on Atlantic coast, S.E. of Para. Several short ranges occupy the interior. The Parnahyba and Mearim rivers are navigable for some distance. The forests yield timber, vanilla, and medicinal substances, and coffee, tobacco, sugar, cotton, rice, and corn are grown. Silkworms are reared, and there are gold mines. Area, 177,530 sq. m. Pop. 500,000. (2.) Or ST. LUIZ DE MARANHÃO, cap. of above state, on island between mouths of Mearim and Itapicuru rivers. Pop. 38,000.

Marano di Napoli, tn., prov. Naples, Italy, 5 m. N.W. of Naples; produces wine, grain, and fruits. Pop. (1901) 10,252.

Maranon. See AMAZONS.

Maranta, a genus of tropical herbaceous plants belonging to the order Scitamineæ. They have creeping rhizomes, and bear terminal inflorescences. Marantas can be cultivated in the temperature of the stove, in a light sandy soil containing a fair proportion of leaf-mould. The roots of several species yield arrow-root.

Maraschino, a white liqueur distilled from a cherry grown in Dalmatia. It somewhat resembles kirschwasser, possesses a very pleasant flavour, and about 34 per cent. of alcohol by volume.

Marash, tn., vilayet Aleppo, Asiatic Turkey, at the foot of Mount Taurus, 90 m. N.E. of Alexandretta, its port. There are churches and schools belonging to the American mission and to the Jesuits. The principal trade is in Kurd carpets and embroideries. Hittite inscriptions have been found in the vicinity. The town is believed to occupy the site of the ancient Antiochia ad Jaurum. Pop. 50,000, one half Armenians.

Marasmius, a genus of mushrooms, with very tough gills which are not incised. They can be dried, and when soaked in water, they resume their forms. The champignon, or fairy-ring mushroom (*M. orcadus*), belongs to this genus. It is of a pale

red colour with white gills, and is valued as food.

Marat, JEAN PAUL (1743-93), French revolutionist, was born at Boudry, near Neuchâtel. He set up in practice as a physician in London, and in 1777 was appointed physician to the bodyguard of the Comte d'Artois. While in London Marat published two volumes of his *Essay on Man* (1773), a political work called *The Chains of Slavery* (1774), and a treatise on the *Diseases of the Eyes*. From 1783 till 1789 he devoted himself to the study of heat, light, and electricity. On the outbreak of the French revolution he wrote several pamphlets, and in September 1789 brought out the first number of the journal *L'Ami du Peuple*. Marat was by nature profoundly suspicious. Bailly and Lafayette were the early objects of his distrust, and the latter endeavoured to arrest him. Marat, however, escaped, and during Lafayette's supremacy was forced to hide. After the massacre of the Champ de Mars on July 17, 1790, Marat fled to England. In the Convention Marat represented Paris, and in the struggle between the Jacobins and the Girondists he took a leading part. In April 1793, at the instance of the Girondist government, he was tried, but was acquitted; and his acquittal was a serious blow to the party in power—'the martyr of liberty,' as Marat styled himself, became more popular than ever in Paris. But on July 13 he was murdered by Charlotte Corday, a Girondist enthusiast. See Chèvremont's *Jean Paul Marat* (1880).

Maratha, or MAHRATTA, a word meaning 'robber' or 'rebel.' The epithet was applied by the Mogul soldiery to those Hindus who rose against the tyranny of imperial Delhi. The term is now generally used to indicate the Marathi-speaking Hindu population of India. The Marathas were once a power in India, where three Maratha states still exist—*viz.* Gwalior, Indore, and Baroda. The Maratha language is related to Sindhi and Gujarati, and is spoken by from fifteen to twenty millions of people. Its literature, beginning in the 13th century, is abundant. See James Grant Duff's *History of the Marathas* (1826).

Marathon, tn., Attica, ancient Greece, on E. coast, 25 m. N.E. of Athens; famous as the scene of the decisive victory gained by the Athenians over the Persians in 490 B.C. The mound raised over the Athenian dead was explored in 1890.

Marattia, a genus of tropical evergreen ferns with capsules opening by slits down their inner faces, belonging to the order

Filices. They are desirable stove plants, thriving in a light, sandy soil containing peat. Their roots should have almost constant access to water. *M. fraxinea*, from Guinea, has fronds up to fifteen feet in length.

Maravedi, a Spanish coin of the 11th and 12th centuries, first struck at Cordova as a gold coin by the Almoravides. After 1474 it was the smallest Spanish bronze coin, value less than a farthing. It circulated down to 1848.

Marbeck, or MERBECKE, JOHN (1523-85), organist of St. George's Chapel, Windsor; published a *Concordance* and *The Boke of Common Prayer Noted* (1550), an adaptation of plain chant to the first liturgy of Edward VI.

Marble, in strict usage, designates only those varieties of limestone which have become entirely crystalline by the operation either of heat or of pressure, and sometimes of both combined. Ordinary limestones are often converted into marbles by contact with molten igneous rocks, such as intrusive masses of granite. Its contained minerals often give marble a variegated colour, as they may be red or brown (*e.g.* garnet and idocrase), green (diopside, actinolite), black (spinel, graphite), or yellow (mica, chondrodite). If the limestone was originally pure, the marble is white. The best marbles are invaluable for statuary purposes, the finest of all being that quarried at Carrara in Italy. The ancient Greek sculptors used for their finest work Parian marble and marble of Pentelicos, both white. Marbles are used also in polished slabs for decorating interiors and as building stones; though when exposed to wet climates and to the impure atmosphere of cities they decay rapidly. The beautiful Connemara marble and the pinkish Tisee marble are two real marbles, but a great number of ornamental limestones are constantly and erroneously referred to this category. They come largely from Derbyshire, Staffordshire, Bristol, Devonshire, and Ireland. Some of them are black from the admixture of carbonaceous matter, but most of them are variegated. Others owe their beauty to the presence of white fossils (encrinites, corals, brachiopods) on a groundwork of different colour. Ruin marble has some resemblance to a drawing of ruined castles on a white background. These are used principally for mantelpieces, table-tops, pilasters, and for smaller objects, such as vases and paper-weights. Imitation marbles are manufactured on a large scale by painting polished surfaces of wood or slate, or by mixing fragments of marble in a hard cement-

ing matrix, and then sawing the mass into blocks and polishing these in the ordinary way. See Blagrove's *Marble Decoration* (1888), and Lee's *Marble and Marble Workers* (1888).

Marblehead, tn. and summer resort, Massachusetts, U.S.A., on Massachusetts Bay, 18 m. s.e. of Boston. The chief industries are yacht-building and shoemaking. Pop. (1900) 7,582.

Marburg. (1.) Town, crown-land of Styria, Austria, on l. bk. of Drave, 37 m. s.e. of Graz, is the seat of the bishop of Lavant. Here are railway workshops. Leather, flour, spirits, and beer are manufactured. Pop. (1900) 24,501. (2.) Town, prov. Hesse-Nassau, Prussia, on river Lahn, 60 m. N. of Frankfort, contains the 13th-century castle of the land-graves of Hesse, which was the scene in 1529 of the disputation between Luther and Zwingli. It has a university, founded in 1527, and manufactures leather, pottery, machinery, surgical instruments, carpets, and tobacco. Pop. (1900) 17,531.

Marcabrun (c. 1100), Provençal troubadour, born in Gascony. Some of his poems deal with the expeditions of Alfonso VII. of Castile against the Saracens (1135-47). His style is often very difficult. See Diez's *Leben und Werke der Troub.* (2nd ed., pp. 37-45).

Marcantonio, or M. RAIMONDI (c. 1488-c. 1534), Italian engraver, born at Bologna. He copied Albert Dürer's works, which he sold as his own. He afterwards became acquainted with Raphael and Giulio Romano, who employed him to engrave their works. See *Life* in French by Delaborde (1887).

Marcasite, one of the sulphides of iron (FeS₂), occurs as a mineral, and has the same chemical composition as pyrites. It forms nodules, films, incrustations, and irregular masses (sp. gr. 4.65-4.9, h. = 6-65), very often in coals, clays, and other sedimentary rocks. It is used in the manufacture of sulphur and of sulphuric acid.

Marceau, FRANÇOIS SÉVERIN DESGRAVIERS (1769-96), French soldier, born at Chartres, commanded in the Vendean war (1793), took Koblenz in 1794, and operated with Jourdan in 1796 in the blockade of Mainz. He received his death wound at Altenkirchen, and died a prisoner in the hands of the Austrians. See *Life* by T. G. Johnson (1896).

Marcello, BENEDETTO (1686-1739), Venetian poet and musician, was one of the most original composers of his day, and his musical settings of *Paraphrases of the Psalms* (1724-7) are amongst the grandest compositions of

sacred music. He also wrote cantatas, oratorios, and concertos. See *Life* by Boito, in *Great Musicians Series* (1881).

Marcellus, at ancient Rome a family of the Claudian clan. (1.) MARCUS CLAUDIUS MARCELLUS was five times consul; in his first consulship, in 222 B.C., in a battle against the Insubrian Gauls, he himself killed their king, Britomartus or Viridomarus, and so won the *spolia optima* for the third and last time in Roman history. He was a leading general in the second Punic war; his chief success was the capture of Syracuse in 212 B.C. In 208 he fell in a skirmish against Hannibal. (2.) MARCUS CLAUDIUS MARCELLUS was born in 43 B.C., adopted by his uncle, the Emperor Augustus, who gave him his daughter Julia in marriage, and intended to make him his successor; but he died in 23 B.C. Virgil has immortalized him (*Æneid*, vi. 860-886).

Marcet, JANE (1769-1858), authoress, born at Geneva, married (1799) Alexander Marcet, a lecturer at Guy's Hospital, London. Besides *Stories for Young Children* (1831), she wrote instructive books for the young, all exceedingly popular, the best known being *Conversations on Political Economy* (1816), *On Chemistry* (16th ed., 1853), and *On Natural Philosophy* (1819).

March. See YEAR.

March, in music, a form of composition which must have a well-defined rhythm, and is usually written in common time. The famous Welsh war-song, *The March of the Men of Harlech* (1468), is believed to be the earliest known example. The military march, as a harmonized composition, dates from the middle of the 17th century. In all military marches the drum plays an important part.

March. (1.) Market town, Isle of Ely, Cambridgeshire, England, on the Nen, 7 m. s.s.w. of Wisbech, has the Gothic church of St. Wendreda, carries on engineering, and makes agricultural implements. Pop. (1901) 7,565.

(2.) Or MORAVA, riv., Moravia, Austria, rises in the Sudetic Mts., on the boundary of Silesia, and flows s., forming the boundary between Austria and Hungary, and falls into the Danube 26 m. E. of Vienna. Length, 210 m.; navigable 50 m.

March, AGNES, COUNTESS OF. See BLACK AGNES.

March, AUZIUS, or AUGUSTIN (d. 1459), Spanish poet, was born in Valencia. Like Petrarch, of whom he was a student, he wrote in the Catalan dialect poetry of great freshness and beauty—e.g. *Cants d'Amor*, *Cants de Mort*, *Cants morals*, and *Cant espi-*

tual. His influence on Spanish poetry was great.

Marchand, MAJOR. See FASHODA.

Marchantia, a genus of liverworts, of which a common species, *M. polymorpha*, is often found on moist earth and damp walls. The flat thallus is often about four inches long, and from it arise special shoots which bear the antheridial shields on the upper side, and the archegonial stars on the under side, either on shoots of the same or different plants.

Marchena, tn., prov. Seville, Spain, 30 m. E. of Seville, is a picturesque old town with Moorish fortifications. It is noted for its sulphur springs. Pop. (1900) 12,468.

Marches, RIDING THE. See BOUNDS, BEATING THE.

Marches, dist. of Italy, including provs. of Ancona, Ascoli Piceno, Macerata, and Pessaro e Urbino. The principal products are maize, wine, and tobacco. It manufactures silk, straw-plait, and paper. Area, 3,797 sq. m. Pop. (1901) 1,064,749.

Marchesi, BLANCHE, or BARONNE A. CACCAMISI, French singer, was born in Paris; sang first in Berlin (1895); appeared in the *Walkyrie* at Prague (1900); made her début in England with the Moody-Manners Company at Liverpool; and sang at Covent Garden in 1902-3.

Marchetti, FILIPPO (1835), Italian musical composer, born at Rome; president of the St. Cecilia Academy in Rome. He brought out his first opera, *Geniale di Varano*, at Turin in 1856. His chief operas are *Il Paria*; *Romeo e Giulietta* (1865), produced at Milan; *Ruy Blas* (1869); *Gustave Wasa* (1875); and *Don Giovanni d'Austria* (1881).

Marchfeld, plain, N. of Danube, opposite Vienna. Here, in 1260, Ottokar of Bavaria defeated Bela IV. of Hungary, and in 1278 was himself defeated by Rudolph of Hapsburg. In 1809 the battles of Aspern and Wagram were fought here.

Marchienne-au-Pont, tn., prov. Hainault, Belgium, on riv. Sambre, 2 m. w. of Charleroi, amid coal fields. Pop. (1900) 18,938.

Marching Order, the dress prescribed to be worn by troops when serving in the field, undergoing training, on manoeuvres, and on field days, and when marching, undergoing inspection, or changing stations. For the men it consists of the No. 2 service dress, with forage caps and covers, or the helmet without plumes, and the full equipment, including haversack, ammunition pouches, cross belts, water bottle, etc. Officers in marching order wear their undress uniforms and patrol jackets.

Marcianise, tn., prov. Caserta, Italy, 18 m. N. of Naples; trades in fruits and grain. Pop. (1901) 12,891.

Marcion, a heretic of the 2nd century, whose doctrine was largely tinged with Gnosticism, was a native of Sinope in Pontus. He came to Rome and turned Christian, but soon thereafter, under the influence of the Gnostic Cerdo, renounced the current views of the church. Marcion held that the gospel was something entirely new, the absolute antithesis of the old order, unprepared for either by law or prophet; and that it was Christ's special task to undo the work of the lower divinity of the Jews—i.e. Judaism—and all the works of its God. Marcion's followers were required to abstain from wine, flesh, and marriage. As a basis for theology he drew up a canon of Scripture, embracing only ten epistles of Paul; he also accepted a gospel which bore the name of Luke; but these he purged from all that traversed his views. He had a considerable following, but the sect seems to have ultimately merged into Manichæism in the 6th century. See works by Hahn, Harnack (in *Hist. of Dogma*), and Lipsius.

Marcomanni, Germanic tribe who originally dwelt between the Rhine and the Danube; but they expelled the Boii from Bohemia and part of Bavaria early in the Christian era, and founded a kingdom which reached to the Danube. During the reign of Marcus Aurelius (161 to 180 A.D.) they waged war with Rome, until peace was purchased by Commodus.



Guglielmo Marconi.

(Photo by 'The Biograph Studio,' London.)

Marconi, GUGLIELMO (1874), Italian electrical engineer, was born at Grifone, near Bologna, his mother being an Irishwoman. His first experiments in wireless telegraphy were made in Italy

in 1895, then put to practical use in England in 1896. In 1899 he established connection by the same means across the English Channel, in 1901 between Cornwall and Newfoundland, and in 1902 between Canada and Newfoundland. In 1904 he entered into an agreement with the British post office for the commercial transmission of wireless messages; and in the same year, through the same means, the first ocean daily newspaper was started on the ships of the Cunard line. His system is in use in the British, Italian, and other navies.

Marco Polo. See POLO.

Marcus Aurelius. See AURELIUS.

Marcy, ETIENNE JULES (1830-1904), French physiologist, was born at Beaune (Côte d'Or); became in 1869 professor at the Collège de France in Paris. He was a successful deviser of means for measuring physiological movements, such as the sphygmograph. See his *Des Mouvements des Fonctions de la Vie* (1868), and *La Méthode Graphique dans les Sciences Expérimentales* (1878-84).

Marcy, MOUNT. See ADIRONDACKS.

Mardin, tn., vilayet Diarbekir, Asiatic Turkey, 5 m. S.E. of Diarbekir, on slopes of Mardin Hills. It is the seat of an American mission. Pop. 12,000.

Mardonius, Persian noble, son-in-law of Darius. In 492 B.C. he commanded an expedition against Athens and Eretria; but the land army was cut up by a Thracian tribe. In 480 he shared in the expedition against Greece. After Xerxes' retirement he commanded the Persian army left in Greece, which captured Athens a second time in 479 B.C., but which was destroyed at Plataea in the same year, he himself being slain.

Maremma, marshy region, Tuscany, Italy, extending from Orbetello to Piombino, and stretching from 15 to 20 m. inland. In olden times it was densely peopled, but is now almost a desert. See Ouida's *In Maremma* (1882).

Marengo, vil., near Alessandria, Italy. Here Napoleon, on June 14, 1800, completely defeated the Austrians under Melas.

Marenzio, LUCA (1560-99), Italian musical composer, born at Coccaglio, near Brescia; became *maestro* to Cardinal d'Este, then to Sigismund III. of Poland, and finally organist to the Pope's chapel in Rome. He perfected the madrigal, and his compositions suggest the spirit of modern tonality by their chromatic modulations.

Mareotis Lake. See MARUT, BIRKET-EL.

Mare's-tail, or HIPPURESS, a genus of aquatic herbaceous plants, belonging to the order

Haloragaceæ. *H. vulgaris*, the common mare's-tail, is a native of Britain, where it is fairly common in stagnant water. It has simple, erect, jointed stems, with whorls of about ten linear strap-shaped leaves, with hard tips; and bears in summer inconspicuous greenish flowers, which are sessile in the axils of the upper leaves. It is easily grown in the bog garden.

Mareuil, ARNAUT DE. See ARNAUT.

Margaret (1353-1412), queen of Denmark, Sweden, and Norway, daughter of Valdemar IV. of Denmark; married (1363) Haco VII. of Norway, whom she succeeded in 1380, while the death of her son Olaf in 1387 put her in possession of the Danish crown also. She then assisted the Swedes to expel their unpopular king, Albert of Mecklenburg; was elected queen; and in 1397 united all three kingdoms into one monarchy by the union of Kolmar. She was called the Semiramis of the North.

Margaret of ANJOU (1430-82), queen consort of Henry VI. of England, daughter of René of Anjou. Owing to Henry's imbecility, Margaret's authority was supreme. She strove to uphold the rights of her son Edward in the wars of the Roses, until captured at Tewkesbury (1471). She was ransomed by Louis XI., and died near Saumur in Anjou.

Margaret of NAVARRE (1492-1549), was born in Angoulême, the daughter of Charles of Orleans, and was married in 1509 to the Duke of Alençon, and, after his death in 1525, to Henri d'Alburt, king of Navarre. She was a patroness of science and arts, and exercised her influence in favour of toleration. Her literary fame rests on the *Héptaméron des Nouvelles*, which is modelled after the *Decameron* of Boccaccio. The book is a remarkable combination of religious mysticism and daring expression on questions of morals (new Eng. trans. by J. S. Charters, 1894; and by W. M. Thomson, 1896).

Margaret of PARMA (1522-86), a natural daughter of the Emperor Charles V.; was married first to Alexander de' Medici, and later (1538) to Octavio Farnese, Duke of Parma. She was created governor of the Netherlands (1559-67), but her severity drove them into rebellion.

Margaret of VALOIS (1553-1615), a daughter of Henry II. of France and Catherine de' Medici, was in 1572 married to Henry of Navarre, who afterwards became Henry IV. of France, and was divorced from him in 1599. She was the last of the house of Valois, and the writer of *Mémoires* (1628; new ed. 1872).

Margaret, St. (1045-93), queen of Scotland, born in Hungary, the daughter of Edward the Exile of England; married the Scottish king, Malcolm Canmore (c. 1067), and died in Edinburgh Castle. Margaret did much to civilize Scotland by introducing various religious customs, the observance of Sunday, and stricter marriage laws; while her charity to the poor was unbounded. She was canonized (1250). Her head, removed to Douay, was lost during the French revolution; her remaining relics are said to have been enshrined in the Escorial by Philip II. Her *Gospel Book* is in the Bodleian Library.

Margaret Tudor (1489-1541), daughter of Henry VII. of England, born at Westminster; was married to James IV. of Scotland (1503). After his death at Flodden (1513), she married Archibald Douglas, sixth Earl of Angus (1514), and unsuccessfully strove to oppose the regent, the Duke of Albany. She divorced Angus (1527) and married Henry Stewart (1528), who was created Lord Methven by James V.

Margarine, known also as **OLEO-MARGARINE** and **BUTTERINE**, is a substitute for butter, first manufactured in 1870 in France by its inventor, Mège-Mouries. The process is as follows:—The best beef fat is washed in cold water and melted in a steam pan at a temperature of 77° C., the melted fat being run off and slowly cooled. The quality of the product depends in great measure on the care exercised at this stage of the process. The semi-solid fat is subjected to pressure, and the expressed liquid fat ('oleo'-margarine) is mixed with cotton-seed, coconut, and other oils, churned with milk and colouring matter, and after salting and working on a butter table is ready for sale. The main difference between butter and margarine is that in butter fat there is a relatively large percentage of soluble and volatile fatty acids, but in butterine or margarine these are practically absent.

Margarita, isl. in Caribbean Sea, off coast of Venezuela, 40 m. long; it rises in the E. to 3,240 ft. Pop. 40,000.

Margary, AUGUSTUS RAYMOND (1846-75), Anglo-Indian traveller, born at Belgium, Bombay Presidency, India; proceeded to China as student interpreter (1867), and travelled overland through S.W. China from Hankow to Bhamo (1874), and was murdered at Manwyn, on the Chinese frontier. His *Journals* were published in 1876.

Margate, munic. bor., wat.-pl., and seapt., Isle of Thanet, Kent, England, 4 m. N.N.W. of Ramsgate; has a sea-front

of nearly three miles, and is noted for its health-restoring air. Steamers run from Margate to France, Belgium, London, and other neighbouring ports. Noteworthy institutions are the Royal Sea-Bathing Hospital (1796), and the Deaf and Dumb Asylum. Adjacent to Cliftonville, the fashionable quarter, is Dane Park, opened 1898. The Grotto is a curious artificial cave adorned with shell mosaics, discovered in 1837. Pop (1901) 23,057.

Margaux, tn., dep. Gironde, France, 15 m. N.W. of Bordeaux, is noted for its Medoc wines. Pop. (1901) 1,757.

Margay (*Felis tigrina*), a small carnivore with a spotted coat. It inhabits forest regions from Mexico to Paraguay. Length, with tail, 3 ft.

Marggraf, ANDREAS SIGISMUND (1709-82), German chemist, born at Berlin; head of the chemical side of the Academy of Sciences there; noteworthy for his researches on phosphoric acid, and for his discovery of cane sugar in beetroot.

Margilan, or **MARGHILAN**, tn., Russian Central Asia, cap. of Ferghana prov., 150 m. S.E. of Tashkend. Nine miles from Old Margilan the Russians have constructed the new (European) city of Novo-Margilan. Market-gardening flourishes, and camel's-hair, woollen, and silk stuffs are made. Pop. (1897) 36,592.

Margin, a term used in monetary transactions to indicate the difference between the market value of the securities deposited to cover a loan and the actual advance made. This difference is to allow for possible depreciation of the securities deposited, and the amount of it will depend on the nature of the securities and on their general liability to sudden fluctuations without warning. Thus the margin on consols as a security will be less than on 'industrial.' The margin exacted by bankers in the ordinary course of business varies from 10 to 25 per cent. By an extension of this practice a very great deal of purely speculative business is done, but usually by brokers outside the regular stock exchange. A deposit of from 5 to 10 per cent. is made by the speculator upon margins with his broker. Should the security selected depreciate more than this amount, the transaction is closed till a new deposit is made. Should the security rise in value, the speculator receives the difference after deducting the commission. This kind of speculation easily lends itself to dishonesty, and becomes simply gambling, with the odds heavily against the speculator. The places where such transactions are carried on are called 'bucket shops.'

Margrave, originally the governor of a march or frontier district, such as the Germans held against the Slavs and the Magyars. These officers were first appointed in the time of Charles the Great, but eventually the title was divorced from the office and became a title merely.

Marguerite. See **CHRYSA-THENUM**.

Margyricarpus, a genus of shrubs belonging to the order Rosaceæ. They bear small, solitary, sessile flowers, followed by bright white fruits, whence the popular name of pearl fruit. *M. setosus*, a little evergreen shrub from the Andes, is a hardy rockery plant, liking a well-drained soil that contains leaf-mould. It grows three feet in height, and has imparipinnate leaves.

Marheineke, PHILIPP KONRAD (1780-1846), German theologian, was born at Hildesheim, Hanover; was professor at Erlangen (1805), Heidelberg (1807), and Berlin (1811), where he was the colleague of Schleiermacher, Neander, and Hegel. His dogmatic system, set forth in *Die Grundlehren der Christlichen Dogmatik als Wissenschaft* (1819), is a recast of Christian facts and doctrines in the mould of the Hegelian logic—pantheism masquerading as Christianity. Other works are *Geschichte des Christlichen Moral* (1806), *System des Catholicismus* (1810-13), *Geschichte der Deutschen Reformation* (1816; 2nd ed. 1831-4), *System der Theol. Moral* (1847), *Vorlesungen über die Theologische Moral, Dogmatik, Symbolik, und Dogmengeschichte* (1847-9).

Maria Christina (1806-78), queen of Spain, was the daughter of Francis I. of Naples, and in 1829 was married to Ferdinand VII. of Spain. After his death, in 1833, she ruled as regent for her daughter Isabella, but resigned in 1840 in consequence of popular disturbances aroused by the Carlists.

Maria Christina, queen and queen-regent of Spain (1858), was born of the Austrian royal family, and was married to Alfonso XII. of Spain. During the minority of her son, who became king in 1902 as Alfonso XIII., she was queen-regent.

Mariana, JUAN (1536-1624), Spanish historian, born at Talavera. He became a Jesuit, and studied and taught in Italy and France until 1574, and passed the rest of his life at Toledo. His *History of Spain* was published in Latin (1592), and in Castilian (1601). The style is fresh and charming, and the work remains a classic, though minute exactness is not claimed for it. His other works include *De Rege*, a treatise on monarchy (1599),

which, however, was condemned and burnt in 1611. The author was imprisoned on account of other essays, and of his attitude towards the Society of Jesus, from which he was expelled. See *El Padre Mariana* by Garzon (1888).

Marianthus, a genus of Australian twining or procumbent shrubs belonging to the order Pittosporaceae, bearing panicles of blue, white, or pink flowers, followed by capsular fruit. They are easily grown as trellis plants in greenhouses, a light peaty soil being the suitable compost.

Maria Theresa (1717-80), queen of Hungary and German empress, was daughter of Charles VI., and was born at Vienna. For nearly thirty years (1713-40) it was her father's endeavour to secure for her, as he did by the Pragmatic Sanction, the right of succession to the imperial crown. She married Francis of Lorraine, whom, when crowned herself at Presburg (1741), she nominated joint-regent with herself. Her succession was at once challenged by Charles Albert of Bavaria, supported by the French, by the elector of Saxony, and by the kings of Prussia, Spain, and Sardinia. On the success of Charles, who was proclaimed emperor (1742) as Charles VII., she took refuge in Hungary, and the Magyars helped her to win back her crown (1748). Silesia, however, during the struggle (1742) was taken by the Prussians, and this gave rise fourteen years later to the Seven Years' war. (See AUSTRIA and PRUSSIA.) In 1772 Poland was partitioned by Catherine II. of Russia, Frederick of Prussia, and Maria Theresa, who acquired Red Russia (Galicia). Between 1777-9 she engaged in another war with Prussia. After 1763 the empress instituted many reforms in army, justice, and education; opened to trade the ports of Trieste and Fiume, assigning the latter to Hungary; expelled the Jesuits, and confiscated much church property; and abolished legal torture. With much of her later policy Count von Kaunitz is associated. In honour of Marshal Daun's victory over the Prussians at Kolin (1757), she instituted the military order bearing her own name. She was the mother of the emperors Joseph II. and Leopold II., and of Maria Antoinette. See Arneith's *Geschichte Maria Theresia* (10 vols. 1863-79).

Maria Theresiopel. See SZABADKA.

Mariazell, tn., duchy of Styria, Austria, 60 m. s.w. of Vienna, has a shrine of the Virgin, which attracts 200,000 pilgrims annually. Pop. (1901) 1,341.

Marcia, a genus of tropical herbaceous plants belonging to

the order Iridaceae. They have short rhizomes, coriaceous leaves, and six-partite perianths. Some of the species make desirable plants for glass-house cultivation. They should have a light, though rich, well-drained soil, and plenty of water.

Maria Antoinette, JOSEPH JEANNE (1753-93), queen of France, wife of Louis XVI., daughter of Francis I. and Maria Theresa, was born at Vienna, November 2, the day of the Lisbon earthquake. Becoming queen of France in 1774, her influence over Louis XVI. was great but profitless; she thwarted him in his wish to yield reform, and urged him to absolutism. She was blamed for the extravagance of her predecessors as well as for her own. Disliked by the courtiers, hated for her favours to the Princess Lamballe (whose head was flourished before her prison window) and the Duchess de Polignac, held responsible for dismissing Turgot and Necker and summoning Loménie de Brienne and Calonne to office, basely besmirched in reputation and stung at heart by the affair of the diamond necklace (1785), she by her unpopularity helped to ruin the royal cause. Still she faced the mob of women at Versailles (October 5 and 6) with splendid courage; and after the flight to Varennes (1791) she accompanied Louis to the Assembly, and later to the Temple, where her fortitude and patience equalled her previous bravery. Accused before the revolutionary tribunal of intriguing with the enemies of France and of stirring up civil war, she was condemned and executed (October 16, 1793). See *Histoire de Marie Antoinette*, by Rochetier (2nd ed. 1892); *Marie Antoinette*, by Tschudi (1902); Gower's *Last Days of Mary Antoinette* (1885); Carlyle's *French Revolution and The Diamond Necklace*; *Mémoires*, by Madame Campan (1849); and *M. Antoinette* by Pierre de Nolhac (1890).

Maria de France, Anglo-Norman poetess of the 12th century. Her works include a collection of Breton *Lais*, and translations of *The Fables of Aesop* and the *Purgatory of St. Patrick*. She appears to have spent much of her life in England. Marie's style is graceful, and she tells her story with a charming ease and simplicity. See *Lais Marie de France* (ed. D. Warnke, 1901) and *Fables de Marie de France* (1820, includes the *Fables*); *Lais Inédites*, by Gaston Paris, in *Romania VIII.*; *Lais of Marie de France* (Eng. trans. by Edith Rickert, 1901); *Four Lais of Marie de France and Others*, by J. L. Weston (1900, being No. 3 of Arthurian Romances), contains

lais not included in above; *The Lay of Guingamor* (1897) and *The Lays of Grail and Lanval* (1900), both by Dr. W. H. Schofield.

Marie de' Medici (1573-1642), daughter of Francis, grand-duke of Tuscany, married (1600) Henry IV. of France. After the murder of her husband by Ravaillac, she was appointed queen-regent, but allowed herself to be governed by two Florentine adventurers, Concini and his wife Leonora, until the young king, Louis XIII., caused Concini to be assassinated, and exiled Mary to Blois, whence she made her escape to Angoulême in 1617. After endeavouring to stir up civil war against her son, she fled to Brussels in 1631, and was for a time resident in England with her daughter Henrietta Maria, wife of Charles I. She died at Cologne, almost lacking the necessities of life. See *Life* by Pardoe (2nd ed. 1852).

Marienbad, wat.-pl. (since 1808), Bohemia, Austria, 40 m. N.W. of Pilsen. Its springs vary in temperature from 48° to 53°. Salt and mineral waters are exported. Pop. (1900) 4,588.

Marienberg, tn., Saxony, Germany, 16 m. S.E. of Chemnitz, has manufactures of lace and toys, and silver mines. Pop. (1900) 7,108.

Marienburg, tn., prov. W. Prussia, Prussia, 27 m. S.E. of Danzig. Its fine castle, dating from the 14th century, was the seat of the grand master of the Teutonic order, and belonged to the Teutonic knights until 1457. The town has manufactures of pottery and machinery, saw-mills, flour mills, and cotton factories. Pop. (1900) 10,735.

Marienwerder, tn., prov. W. Prussia, Prussia, near r. bk. of Vistula, 42 m. S. of Danzig, was founded in 1233 by the Teutonic knights. It has a 13th century cathedral; also iron foundries, saw mills, and machinery workshops. Pop. (1900) 9,686.

Marietta, city, Ohio, U.S.A., co. seat of Washington co., on the Ohio, at mouth of the Muskingum, 200 m. E.N.E. of Cincinnati, in a petroleum, coal, and iron region. Here is Marietta College (1835). Pop. (1900) 13,348.

Mariette, FRANÇOIS AUGUSTE FERDINAND (1821-81), French Egyptologist, was born at Boulogne. In 1850 he was sent to Cairo in search of Coptic MSS. He then discovered the Serapeum at Memphis, and, as keeper (1858-63) of monuments to the Egyptian government, devoted his energies to archaeological exploration. He dug out the Sphinx, and excavated Meydun, Gizeh, Abydos, Karnak, etc., and began the excavation of Tanis. He founded

in 1863 the Bulak Museum near Cairo, and the Egyptian Institute, and published many books. In English have appeared *Monuments of Upper Egypt* (1877) and *Outlines of Ancient Egyptian History* (1890).

Marigliano, tn., prov. Caserta, Campania, Italy, 12 m. E.N.E. of Naples. Pop. (1901) 12,452.

Marignac, JEAN CHARLES GALLISSARD DE (1817-94), French chemist, was born at Geneva, and worked with Liebig at Gießen in 1840. Shortly afterwards he became professor at Geneva (till 1878). His principal work included highly accurate determinations of the atomic weights of several of the elements; researches on the rare earths, during which he discovered ytterbium and gadolinium; and important investigations, mostly thermochemical, as to the nature of solution.

Marignano. See MELEGNANO.

Marigold, a name given to several quite distinct flowering plants. The marsh marigold, which produces its handsome rich yellow cups in early summer, is *Caltha palustris*. The corn marigold is the yellow oxeye, *Chrysanthemum segetum*, which flowers in summer and autumn. The half-hardy French and African marigolds of gardens are varieties of certain species of the genus *Tagetes*. The old marigold, or margold of English poets and herbalists, is a hardy annual plant, *Calendula officinalis*. Its evergreen leaves and its bright flowers last nearly the year through. Its habit of opening or shutting its flowers as the sun shines or not has long afforded similes to moralists and poets. Formerly the flowers of the marigold were much used in the dried state as a flavouring for soups, and in possets, broths, and drinks. Marigold flowers were also used for salads and for healing wounds—e.g. in the American civil war.

Marinating, the process of soaking fish or meat, previous to cooking it, in a sort of flavouring pickle made by mixing three tablespoonfuls of vinegar to two of oil, one tablespoonful of salt, one quarter-teaspoonful of pepper, one bay-leaf, one teaspoonful onion juice, and a sprig of parsley.

Marinduque, isl. of Philippines, between Luzon and Mindoro. Area, 667 sq. m. It is mountainous and wooded. Chief exports, cattle, hides, tar, timber, and copra. Chief tn. Boac (pop. 14,722). Pop. of isl. 48,000.

Marine Biological Research. The results obtained during the telegraph surveys led to the equipment of expeditions specially for deep-sea research. The most notable of these was that

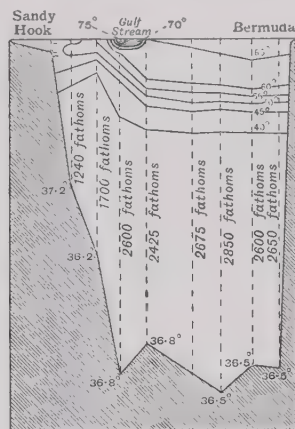
of the *Challenger* (1873-6), under Sir Wyville Thomson. Great attention has been given to scientific investigations connected with fisheries, especially by the United States Fish Commission, the German Commission at Kiel, and the Scottish Fishery Board. At the present time almost every maritime country has one or more laboratories, and many of them have a specially-equipped vessel, engaged in this work. Within the last few years an international commission for the scientific exploration of the sea in the interests of the fisheries has been appointed, all the maritime countries of Western Europe, except France, being represented, and eight or nine steamers and a large staff of scientists are now engaged in this work, from the White Sea to Iceland, and down to the English Channel.

The objects of marine biological research are twofold—(1) to increase our knowledge of the natural history of living beings; and (2) to ascertain the conditions which influence the sea fisheries. In fisheries research, attention is mainly directed to the natural history of fishes, their migrations, reproduction, food, growth, the nature of their eggs, and the causes of fluctuations in their abundance. In both branches of research the physical phenomena of the sea, such as depth, temperature, currents, salinity, which influence marine life, are also studied: this branch is termed hydrography.

The organisms in the sea are collected for study in a variety of ways. Fishing apparatus of all kinds are used, especially trawls and dredges, but also traps, and 'tangles' of teased rope to which rough or spiny forms on the bottom adhere; while the organisms that float in the water are obtained by tow-nets, of gauze or fine netting, dragged after the boat. Some of these are 'closing' nets, so arranged that they may be made to fish at a particular depth. Soundings to determine the depth are made with greatly improved apparatus, piano wire taking the place of the hempen rope that used to be employed. The heavy sinker is detached mechanically, and left on the bottom if the depth is great; and with the aid of steam reels the greatest depth of the sea can now be accurately ascertained in an hour or two. While the average depth of the sea is a little over two miles—and the sea covers about three-quarters of the surface of the globe—the greatest depth ascertained is 31,614 ft., or nearly 6 m., found near one of the Ladrone Islands, in the N. Pacific. Depths almost as great

have been discovered off New Zealand and Japan; while, in the Atlantic, the deepest sounding taken was 27,366 ft., off Puerto Rico. From the peak of the highest mountain to the greatest depth in the sea the vertical distance is over 10 m.

Surface temperature may be readily determined by an ordinary thermometer; but below the surface specially-constructed thermometers are employed, designed (1) to resist the pressure of the water, which is enormous in the great depths, amounting to about one ton per square inch for every thousand fathoms; and (2) to automatically register the temperature. A sample of the water is also brought up for chemical analysis. All these operations may be accomplished at a single sounding, together with another, viz. the bringing up of a sample of the ooze or deposit on the



Temperature Curves for part of the North Atlantic.

bottom for investigation. Currents are determined (1) by current meters, maintained in a fixed position, though often they cannot be employed; (2) by the use of floats, usually bottles, containing information by which the place where they were cast away can be identified—these are useful only for surface currents; (3) by a periodical study of the temperature and other physical properties of the water over an area and at different depths, by which the movements of large masses of water can be traced.

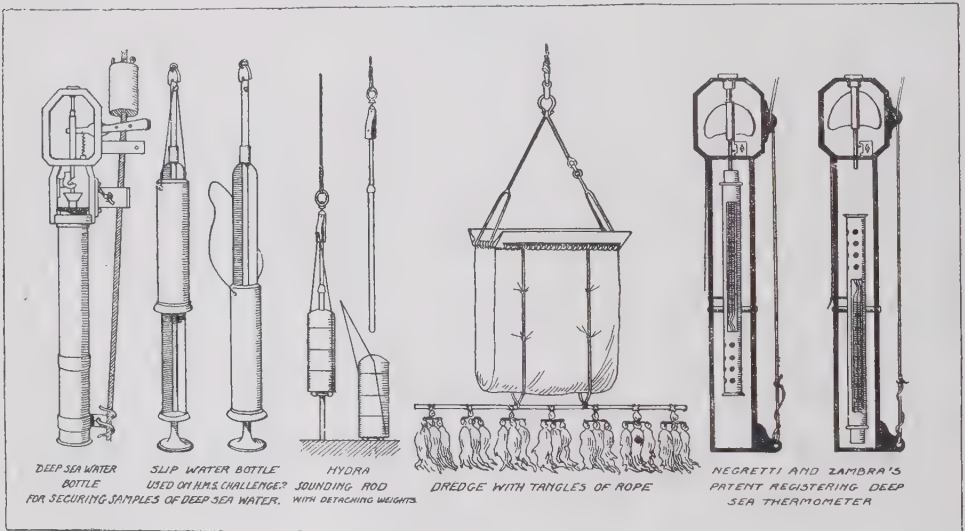
All animal life in the sea depends ultimately upon plants or vegetable life; but plants are scarcely represented beyond a depth of 50 fathoms, and they are quite absent below 200 fathoms. On the other hand, everywhere at the surface, over all the ocean, and within the limit of the light-

zone, multitudes of minute plants exist, such as diatoms; these form the food, directly or indirectly, of the animal life which is present in the surface waters. These floating organisms, plants as well as animals, are known as 'plankton,' as distinguished from the 'benthos,' or those living at the bottom. They are the cause of the phosphorescence so common at the surface. In some parts of the sea larger plants may exist in abundance, as in the Sargasso Sea, which occupies about three million square miles of the Atlantic.

The animals in the deep water—which forms by far the greater portion of the ocean—must therefore be carnivorous; and nearly all marine fishes are carnivorous.

the fact that the cold water of the polar regions sinks down and creeps along the bottom towards the equator, while the warm surface water takes, in a general sense, the opposite direction. The influence of these conditions on animal life is profound. Vegetation exhibits the same cycle of growth and decay; many animals migrate as the temperature varies, sometimes with as close a relation to the variation as is shown by migratory birds; the period of reproduction is determined, occurring in temperate latitudes in spring and summer, as with birds. Moreover, the growth of marine organisms is controlled by the temperature, varying with the seasons. Rings of summer

have usually exceedingly large eyes—as with owls and nocturnal animals on land—but in the abysses the eyes are usually extremely small. The presence of eyes argues the existence of light, and a considerable proportion of the deep-sea fishes are furnished with luminous phosphorescent organs by which they can manufacture light for themselves; some invertebrates are similarly endowed. These organs vary in form and position: commonly they are placed in rows along the lower half of the body, as if to illuminate the bottom; sometimes they exist as lamps on the front or sides of the head, and again at the end of waving filaments. Whether collectively they serve to illuminate the bot-



Apparatus for Marine Biological Research.

From the restricted penetration of light, it also follows that the deeper waters are cold compared with the surface. The temperature varies with the latitude and season as well as with the depth. In the Red Sea the temperature twenty feet below the surface may exceed 90° F. for several months in the year, and has an annual average of over 80° F.; in the British seas the annual average ranges about 50° F., and the maximum about 60° F.; while on shallow beaches it may vary from 90° F. in summer to freezing-point in winter. In the open sea, even in the tropics, the temperature a few hundred fathoms below the surface is greatly reduced, and is almost constant, while at the bottom it is always close to the freezing-point. This is owing to

growth may be seen on the shells of molluscs, as on oysters, and on the bones and scales of fishes, just as they occur on the stems of trees.

In the abysses of the ocean, on the other hand, the water is shrouded in perpetual night, is icily cold, and is almost absolutely still. Nevertheless, the depths of the sea are peopled with a rich variety of animal life—fishes, echinoderms, molluscs, crustaceans. The fishes, as a rule, are dark-coloured or quite black, but sometimes they are silvery; the invertebrates may be brilliantly coloured—red, yellow, purple, green, but never blue. Many of them are blind. The fishes living in the lesser depths, where a glimmering twilight may be supposed to prevail,

tom waters appreciably, or simply produce a glow in the immediate neighbourhood of the animal possessing them, is a moot point. The fishes of the deep sea are also remarkable, as a rule, for the great relative size of their jaws and the formidable armature of teeth. None of large size have yet been brought up, probably because the nets or dredges used in the great depths must necessarily be small. The greatest depth at which animal life has been found is four and a half miles, in the S. Pacific.

Whether animal life exists in the great intermediate regions of the sea, between the sub-surface waters and the bottom, is not clearly proved. Investigations made by Agassiz in the Pacific with special nets gave negative

results below 400 fathoms. See *Challenger Expedition Reports* (1880-95).

Marine Engine. See STEAM-ENGINE, MARINE.

Marine Insurance. See INSURANCE, and LLOYD'S.

Marines, troops raised for service on shipboard, the first being a body of 1,200 raised in 1664. The divisional system dates from 1755, when the Chatham, Portsmouth, and Plymouth divisions were established. From April 1802 they were styled the Royal Marines. In 1805 a fourth division was raised, that of Woolwich. For a long period, after 1760, all the superior officers of marines were naval officers. The posts were sinecures of considerable value, and the anomaly was not abolished until 1833.

The Royal Marine forces now consist of the Royal Marine Artillery (established as a separate corps in 1862) and the Royal Marine Light Infantry (so called since 1855). The former have their headquarters at Deal; the latter, in three divisions, at Chatham, Portsmouth, and Plymouth respectively. The Woolwich division was abolished in 1869. For the entry of officers into the Royal Marine Artillery the regulations as to age and examination are the same as for the Royal Military Academy at Woolwich, where the examination is held. For the Royal Marine Light Infantry the examination is the same as for Sandhurst. On being appointed a second-lieutenant in the marines, a candidate joins the Royal Naval College, Greenwich, for a course of two terms, at the end of which there is an examination. On successfully passing, a candidate is gazetted lieutenant. The strength of the Royal Marines for 1905 was 20,400. See *Admiralty Instructions*.

Marine Salvage. See SALVAGE.

Marinette, city, Wisconsin, U.S.A., co. seat of Marinette co., on Green Bay, 145 m. N. of Milwaukee. Pop. (1900) 16,195.

Marini, GIAMBATTISTA (1539-1625), Italian poet, was born at Naples; lived at the courts of Rome, Turin, and Paris, and died near Naples. All his poems—lyric, idyllic, and epic—enjoyed extraordinary fame in Europe. There is no depth in any of them, but an excess of brilliant description of the obvious, clothed in a bombastic style. This cult was termed *Marinismo*. The poet's chief work, the *Adone* (1623; ed. by F. d'Ambra, 1895), tells the story of Venus and Adonis. A short epic, the *Strage degl' Innocenti*, appeared in English as *The Slaughter of the Innocents* (1675). The *Opere* were edited by Ziardini

(1861). See monographs by Menghini (1888), Panzacchi (1895), Borzelli (1898), and Damiani (1899).

Marino, tn., prov. Rome, Italy, on the Alban Hills, 15 m. S.E. of Rome; was a stronghold of the Orsini, then of the Colonna. It has a cathedral, and is noted for its wine. Pop. (1901) 7,307.

Mario, GIUSEPPE, MARQUIS OF CANDIA (1808-83), Italian tenor, was born at Cagliari. In the title rôle of *Robert le Diable* (1838) he charmed the Parisians with his perfect voice, and the following year made his début in London in *Lucrezia Borgia*. From 1842 to 1869 he sang principally in these two cities. He was an ideal stage-lover, and his voice was peculiarly velvety and soft. He married the singer Giulia Grisi.

Mariolatry, the worship of the Virgin Mary. We find Epiphanius (4th century) combating the views of the Collyridians, an obscure Arabic sect which worshipped Mary; while the Nestorian movement was originally a protest against her being designated the 'mother of God' (*theotokos*). Augustine gave currency to the view that, while Mary partook of the general corruption of human nature, she was possibly free from actual sin; in the 9th century she is represented as the 'queen of heaven'; Aquinas speaks of her as 'all our hope of salvation'; and Bonaventura as 'the gate of heaven.' This view of her dignity and power has continued to grow, till at the present time her mediatorial place in the Roman Catholic Church has become all but supreme. The Immaculate Conception of Mary was in 1854 declared to be an article of faith by Pius IX. Mariolatry is condemned in the 22nd Article of the Church of England, and in the Westminster Confession, ch. xxi. 2. Catholics, however, are accustomed to rebut the reproaches of Protestants by drawing a distinction between divine worship and reverence, the latter of which only, it is alleged, is accorded to Mary, while the characteristic feature of the former is its being accompanied by sacrifice (the mass). The exalted conception of her character and authority is seen in the various festivals instituted in her honour—e.g. the Conception (December 8), the Nativity (September 8), the Presentation (November 21), the Purification (February 2), the Annunciation (March 25), the Visitation (July 2), and the Assumption (August 15), most of which are also observed by the Greek Church; as also in her prominence in ecclesiastical art; for example, in a Trastevere mosaic of the 12th

century she is represented as enthroned, and equal to Christ. For literature, see MARY.

Marion. (1.) City, Indiana, U.S.A., co. seat of Grant co., 60 m. N.E. of Indianapolis. Pop. (1900) 17,337. (2.) City, Ohio, U.S.A., co. seat of Marion co., 40 m. N. of Columbus. Pop. (1900) 11,862.

Marionettes, originally little images of the Virgin, are jointed puppets worked by hidden actors in miniature theatres. The word in this sense occurs first in Guillaume Boucher (1584). They are also known as *fantoccini*, and *ombres chinoises* form a variety. Figures with jointed limbs have been discovered in tombs in Egypt, where they were used in the feasts of Osiris. They were known in Etruria, Rome, Greece, India, Burma, China, and Java. Punch can be traced in the Roman Maccus and Persian Penj. In the middle ages they were employed to enact mystery and morality plays. Introduced from Italy to France (under Charles IX.), and thence to England, they are alluded to by Chaucer, Shakespeare, Jonson, Pope, *The Tatler* (1709), and *Spectator* (1711). Bartholomew Fair was famed for them, as, later, was Brone's Theatre of Arts (1830-40). In France they were exhibited at St. Germain (1595); and Pothin and Jehan des Vignes (16th century), Brioché (1669), and Le Sage (1721) were connected with them as actors or authors. George Sand had a theatre for them at her castle of Nohant. *Pupazzi*, introduced by De Neuville (1863), revived interest in them at Paris, and marionette representations were given in the Théâtre du Chat Noir (1887-97) by Henri Rivière; and *Ombres françaises* were shown at the Petit Théâtre (1888-92) by Signoret. See Mairdron's *Marionettes et Guignols* (1901), and Charles Magnin's *L'Histoire des Marionettes* (1862).

Mariotte, EDMÉ (1630-84), French physicist, was born in Burgundy, and was one of the first members of the Académie des Sciences, founded in Paris (1666). His most important work was an essay, *De la Nature de l'Air* (1679), which contains a statement of Boyle's law of gases, called by the French 'Mariotte's law.'

Maris, three Dutch painters, brothers—MATTHEW (1835), JACOB (1837-99), and WILLEM (1844)—whose work in landscape, founded on the Barbizon school, influenced largely the growth of the Glasgow school. Matthew is the poet dreaming in colour, whose work is among the most poetic, individual, and winnowed in contemporary art. Jacob, born at the Hague, is considered, in point of personality and expressional

power, as regards the spirit of his day, as one of the greatest depictees of Dutch landscape and life since Rembrandt. His extraordinary talent was recognized in Britain and in France before he was appreciated in his own country. The museums at the Hague and Amsterdam have examples of his work. Willem is purely a landscape painter, who prefers luminous, cheerful aspects of nature. There is a *Landscape with Cattle* by him in the Hague museum.

Marischal, EARL, a title created by James II. of Scotland, and conferred before July 4, 1458, on Sir William Keith, descended from a family which from the time of David I. possessed a portion of Keith in East Lothian, and from the beginning of the 18th century held the hereditary office of great marischal.—GEORGE, FIFTH EARL (1553-1623), defrayed all the expenses of the marriage in 1589 of James VI. to the Princess Anne of Denmark, and founded (1593) Marischal College, Aberdeen.—His grandson, WILLIAM, SEVENTH EARL (1617-1661), became the head of the northern Covenanters, and was very active against Huntly. But in 1650 he supported Charles II., and being taken prisoner at Alyth (Aug. 26, 1651) was sent to the Tower. At the restoration he was appointed keeper of the great seal.—GEORGE, TENTH EARL (1693-1778), fought on the side of the Chevalier at Sheriffmuir in 1715, and having escaped to the Continent, was attainted. In 1719, at the head of a small Spanish expedition, he landed in the western isles, and was defeated at the pass of Glenshiel. Escaping a aim to the Continent, he joined his brother, Marshal Keith, in Prussia, and served under Frederick the Great.

Marists, a modern French and Roman Catholic congregation, instituted as Marist Fathers in 1815, developing into Marist Brothers in 1817 and Marist Sisters in 1834.

Maritime Alps, a portion of the Alps extending from the Col di Tenda (S.E.) to the Col de l'Argentiere (N.W.). The chief peaks are the Punta dell' Argentera (11,140 ft.), Cima dei Gelas (10,286 ft.), Monte Matto (10,128 ft.), Mont Eneastraye (9,695 ft.), and Mont Monnier (9,246 ft., with observatory). The principal passes are the Passo del Pagarin (9,236 ft.), the Col della Cirigia or delle Ceresse (8,370 ft.), and the Col delle Finestre (8,107 ft.), besides the carriage roads over the Col de la Cayolle (7,717 ft.), and the Col d'Allos (7,382 ft.), both leading from Nice to Bar-

celonnette (Ubaye valley); the former by the Var and the latter by the Verdon valley. See John Ball's *Alpine Guide* (1898), and Garnier's *Memoire sur les Alpes-Maritimes* (1888).

Maritime Province extends from the Arctic Ocean to the confines of Korea, and inland to the Stanovoi range and the Ussuri R. The N. part is covered with forest or tundra, where a sparse population maintain themselves by fishing in summer and hunting in winter, or wander about with herds of reindeer. Furs, especially sables, constitute their tribute to the government, while fish constitute almost their only food. Many of the settled inhabitants are Russians or half-breeds. The other inhabitants are Tunguses, Yakuts, Chukches, Koriaks, and Kamchadales (in Kamchatka). Coal is found at the mouth of the Gizhiga and in Kamchatka. Gold is extracted on the Amgun R., and the lower Amur is colonized by Cossacks and Koreans. Formed in 1856, the Maritime Province was enlarged in 1860 by the cession by China of the Ussuri province. Cap. Vladivostok. Area, 715,960 sq. m. Pop. 228,824.

Maritza (Lat. *Hebrus*), riv., European Turkey, rises in the Rhodope Mts., flows E., then S., and falls into the Aegean Sea near Enos; 300 m. in length; navigable for small boats up to Adrianople, 100 m. from mouth.

Mariupol, seap. tn., Ekaterinoslav gov., S. Russia, on N. coast of Sea of Azov, and 60 m. W.S.W. of Taganrog. It exports cereals, linseed, skins, and tallow, to the value of over 1½ millions sterling, and has flour mills, tanneries, foundries, and agricultural implement works. Pop. (1897) 31,772.

Marius, GAIUS (155 B.C.), Roman general, was born at Arpinum; served under Scipio Africanus the younger at the siege of Numantia in 134 B.C.; and became tribune of the Commons in 119 B.C. In 115 he was praetor, and as praetor the next year did good service in Spain. We next find him in Africa serving as legate under the Consul Metellus against Jugurtha. In 107 he was elected consul, and received the command in Africa. He ended the war by the capture of Jugurtha in 106. Next he threatened invasion of the Cimbri and Teutones caused him to be elected consul every year from 104 to 100 B.C. In 102 he destroyed the Teutones at the battle of Aquæ Sextie, and, in 101, annihilated the Cimbri on the Raudine plains. In 100, with Saturninus and

Glauca, Marius led an attempt at a democratic reform; but failed in nerve at the last moment, and actually used his troops against his own friends. Henceforth his importance was gone, though he did command an army with some credit in the social war of 90 B.C., and appeared as a popular leader in the civil troubles of 88 B.C.; but Sulla's seizure of Rome caused him to flee for his life. On Sulla's departure for Asia, the democratic party gained the upper hand; Cinna and Marius entered Rome, and massacred every noble who fell into their hands. Marius was elected consul for the seventh time for 86 B.C. Marius was a soldier of great experience, tactical skill, and sound discipline, but no genius. He converted the Roman army from a citizen into a professional force, and made it the instrument of its general. He also caused the individual soldier to be trained as an expert swordsman, and thus changed the Roman tactics. He was excessively superstitious, being always attended by soothsayers.

Mariut, BIRKET-EL, MAREOTIS, or MAREIA, lagoon, Lower Egypt, separated from the Mediterranean by a narrow ridge of sand on which stands Alexandria. At the end of the 18th century the lagoon was nearly dry; in 1801 breaches were made for the sea to enter. Length, 28 m.; breadth, 20 m.

Marivaux, PIERRE CARLET DE CHAMBLAIN DE (1688-1763), French man of letters, was born at Paris. His first book was a parody on the *Iliad*, but it was as a writer of light comedy, and, above all, as the writer of *Marianne*, a highly-esteemed romance, that his fame was made. Voltaire's epigram that he knew all the bypaths of the human heart, but not the highway, is a searching criticism. The stronger passions have no meaning for him, and he writes away in an atmosphere of moral dilettanteism, of which his 'precious' and somewhat finical style is simply an illustration. His *Œuvres Complètes* were published in 10 vols. (1827-30).

Marjoram, a name given to certain herbs belonging to the genus *Origanum*. The two species commonly cultivated are *O. marjorana*, the sweet marjoram, and *O. onites*, the pot marjoram. They are generally grown as annuals, being sown in a warm situation in April, and the plants thinned to nine inches apart. The tops are cut in July as they begin to flower, and are dried in the shade for winter use. A light soil is preferable.

APPENDIX OF PRONUNCIATION TO THE HARMSWORTH ENCYCLOPÆDIA.

Note.—All unmarked vowels are to be taken as short, as in fat, met, fit, not, but.

All long vowels and diphthongs, except the conventional oo, where no mark is needed, are *marked*, as follows:—

â = a in fate.
ä = a in far.
a = a in fall, or ai in awe.
ë = e in me.
î = i in mine, or ai in aisle.
ô = o in mote.
oo = oo in moon, or u in put.
û = u in mute, or ew in few; also French u.
e = French eu, German ö, or Turkish eu and oi.

Consonants are normally as in English. Special points are:—

c discarded, being = either t or s in sit or k in cat.
ch as ch in chin.
ch = German ch in ich and Keltic ch in loch.
dh = th in then.
g = g in give, go: always hard.
ng = ng in singer.
ng = ng in finger.
j = j in joy.
q discarded, being with u, which always follows it = kw.

th = th in thin.

w = w in wet: is never a vowel.

x discarded, being = ks or gs.

y = y in you: is never a vowel.

z = z in zeal.

zh = s in treasure.

Special Values (mostly makeshifts).

' = Semitic ain (Arabic and Hebrew), as in 'abd, slave.

' = e mute (Hebrew and French), as in yab'dâl, d'la (de la).

' separates the aspirate in the aspirated letters of Hindi, Urdu, and the other neo-Sanskritic languages. Thus—

bhag, p'hâl, t'hop, g'hâr, ch'hâr, etc.

gh = ghain (Arabic), as in gharb, the west.

ñ = nasal n (French, Portuguese, Arabic,

etc.), as in mon, nação, fauran, etc.

ly = palatal l in William; French ll in *vo-laille*; Italian gl in *cgli*.

ny = French and Italian gn in *seigneur*, *si-gnore*; Spanish ñ and Portuguese nh, as in *señor*, *senhor*.

h = strong Semitic (Hebrew and Arabic) h, as in *bahr*, sea, river.

' = stress, as in *pre'sent*, pre-sent'.

For full discussion of the Pronunciation Scheme see Introduction to Appendix (Vol. I).

VOLUME V.—Hosanna to Marjoram.

Hosea, hō-shā'a or hoz'ē-a.
Hoshangabad, hō-shung-ä-bäd'.

Hoshiarpur, hōsh-yär-poor'.

Höst, hest.

Hostilius, hos-tē'li-oo.s.

Hostrup, hōs'troop.

Hotze, hōt's'.

Houdon, oo-don'.

Houghton, hau'ton.

Houri, ho'ri.

Housatonic, hoo-sa-ton'ik.

Houssaye, oo-sä'.

Houston, hoos'ton.

Hovaz, hoo'vaz.

Howitzer, hau'ts-er.

Howth, hōdh.

Höxter, hek'ster.

Hroswitha, h'rōs'vi-ta.

Hsi-an-fu (Si-ngan-fu),
hsē-an-foo' (sē-ngan-foo').

Hsiang, hsē-ang'.

Hsü-chou-fu, hsü-chau-foo'.

Huai-an, hwi-an'.

Huaina-capac, wi'na-kä'-pak.

Huallaga, wa-lyä'ga (Span.)
or hwa-lyä'ga (Quechuan).

Huambisas, wam-bē'sas.

Huanaco, wa-nä'ko.

Huancavelica, wan-ka-vä-lē'ka.

Huanchaca, wan-chä'ka.

Huanuco, wä'noo-ko.

Huaraz, wä-räth'.

Huascar, was'kar.

Huber, hoo'ber.

Hubli, hoo'blē.

Hübner, hüb'ner.

Huc, ük.

Hué, hoo-ä' or hwä.

Hueffer, hü'fer.

Huehuetenango, wä-wä-ten'ang-ō.

Huelva, wel'va.

Huercal Overa, wer-kal' o-vä'ra.

Huerta, wer'ta.

Huesca, wes'ka.

Huescar, wes'kar.

Huet, ü-ä'.

Hufeland, hoo'f'-land.

Hug, hoog.

Hughes, hüz.

Hugli, hoog'li.

Huguenots, hü'ge-nots.

Hula, hoo-ē'a.

Hui-chou-fu, hwē-chau-foo'.

Huilla, hoo-il'a.

Huitzilopochtli, wit-thi-lō-poch'tli.

Hu-kwang, hoo-kwang'.

Humansdorp, hoo'manz-dorp.

Humayun, hoo-mi'yoön or hoo-mä'yoön.

Humboldt, hoom'bölt.

Hummel, hoom'el.

Humperdinck, hoom'per-dink.

Hung-yen, häng-yen'.

Hünningen, hü'ning-en.

Hünnen-Betten, hün'en-bet'n.

Hunsrück, hoonz'rük.

Hunyad, hoon-yäd'.

Hunyadi, Janoz, hoon-yäd'i, yän'osh.

Hunza-Nagar, hoon'za-nug'ur.

Huo-lu, hwō-lōo'.

Huon (poem), ü-ön'.

Huon (gulf), hoo'on.

Hu-pen, hoo-pä'.

Hurdwar, hur-dwār'.

Huron, hoo'ron.

Hurstmonceaux, hurst'-mon-sō.

Hurtado de Mendoza, cor-tä'do dä men-dō'tha.

Husi, hoo'shi.

Huss, hoos.

Hussites, hoos'its.

Husum, hoos'oom.

Hutten, hoot'en.

Huy, ü'ē.

Huygens, hoig'enz.

Huysmans, ü'es-män.

Huysum, hois'boom.

Hven, hvän.

Hwang-ho, hwang-hō'.

Hwen-thsang, hwen-tsang'.

Hyacinthe, ē-a-sant'.

Hyacinthus, hü-a-kin'thoos or hi-a-sin'thus.

Hyades, hü-a-daz or hi-a-dēz.

Hybla, hü'bla or hib'la.

Appendix of Pronunciation.

- Hydaspes, hū-das'pāz or hi-das'pēz.
Hydnum, hid-num.
Hydra, hū'dra or hī'dra.
Hydragogues, hī'dra-gogz.
Hydrangea, hi-dran'jē-a.
Hydrazine, hī'dra-zīn.
Hydrides, hī'dridz.
Hydriodic, hī-dri-od'ik.
Hydrocele, hī'drō-sel.
Hydrocephalus, hī-drō-sef'-a-lus.
Hydrochloric, hī-drō-klō'-rik.
Hydrocyanic, hī-drō-si-an'ik.
Hydrofluoric, hī-drō-floo-or'ik.
Hydrofluosilicic, hī-drō-floo-ō-si-lis'ik.
Hydrogen, hī'drō-jen.
Hydrography, hī-drog'-ra-fi.
Hydrokinetics, hī-drō-kin-et'iks.
Hydrolysis, hī-drō-lī'sis.
Hydrometer, hī-drom'e-ter.
Hydrophobia, hī-drō-fō-bi-a.
Hydroquinone, hī'drō-kwin-on.
Hydrotherapy, hī-drō-ther'-a-pi.
Hydroxillamine, hī-droks-il'am-in.
Hydrozoa, hī-drō-zō'a.
Hýeres, ē-ár.
Hygieia, hū-gi-á'ya or hī-jé'ya.
Hygiene, hī'ji-én.
Hygrometer, hī-grom'e-ter.
Hýlas, hū'las or hī'las.
Hýlius, hū'l'os or hī'us.
Hymenoptera, hī-men-op'-te-ra.
Hymettus, hū-met'os or hī-met'us.
Hyogo (Hlogo), hē-ō'gō.
Hýoid, hī'oid.
Hypatia, hū-pā'ti-a or hī-pā'shi-a.
Hyperæsthesia, hī-per-es-thē'si-a.
Hyperbolia, hī-per'bō-la.
Hyperborei, hū-per-bō-rā-i or hī-per-bō-rī-i.
Hyperides, hū-pā'ri-dāz or hī-per-i-dēz.
Hyperion, hū-pā'ri-on or hī-pe'ri-on.
Hyperion, hī-pe'ri-on.
Hyperion, hī-pe'ri-on.
Hypersthenite, hī-per-sthen'it.
Hyperthyroidea, hī-per-thi-roid'i-a.
Hypertrichosis, hī-per-tri-kō'sis.
Hypertrophy, hī-pe'tro-fi.
Hypnotism, hip'nō-tism.
Hypnum, hip-num.
Hypocaust, hip-ō-kast.
Hypochæris, hī-po-kē'ris.
- Hypochlorites, hī-pō-klōr'-its.
Hypochlorous, hī-pō-klōr'-us.
Hypochondriasis, hip-ō-kon-dri-a-sis.
Hypophosphorous, hī-pō-fos'for-us.
Hypostasis, hī-pos'ta-sis.
Hypotenuse, hī-pot'e-nūs.
Hypothec, hī-poth'ek.
Hypothesis, hī-poth'e-sis.
Hyracotherium, hī-rak-ō-thē'ri-um.
Hyraz, hī'raks.
Hýrcania, hūr-ka'ni-a or hir-kā'ni-a.
Hysmine, Hysminias, ēs'-min-i, is-min'i-as.
Hystaspes, his-tas'pēz.
Hysteresis, his-te-rē'sis.
- Iacchus, i-ak'koos or i-ak'-us.
Iamblichus, i-am'bli-koos or i-am'blik-us.
Ianthina, i-an'thin-a.
Iapetus, i-ap'et-us.
Iapygia, i-ap-ū'gi-a or i-ap-ē'ji-a.
Ibadan, i-ba-dān'.
Ibague, i-bā'gā.
Ibea, i-bē'a.
Iberia, i-bā'ri-a or i-bē'ri-a.
Ibis, ē'bis or ib'is.
Ibn Batuta, ib'ān ba-too'ta.
Ibn Ezra, ib'ān āz'ra.
Ibn Haukal, ib'ān hau'kal.
Ibn Khalikan, ib'ān kal-li-kān'.
Ibn Tofail, ib'ān tō-fil'.
Ibn Zohr, ib'ān zōr'.
Ibrahim Pasha, ē-bra-hēm'pā'shā.
Ibsambul, ib-sam-bool'.
Ibycus, i'bi-koos or ib'ik-us.
Içá, ē'thā.
Icarus, i-ka'ri-ooos or i-kār'-i-us.
Icarus (Icaria), i'ka-roos or ik'ar-us (i-kār'i-a or ik-ar'i-a).
Icení, i-ka'ni or i-sēn'i.
Ichang, ē-chang'.
Ich Dien, ich-dēn'.
Ichneumon, ik-nū'mon.
Ichor, ē'kōr or i'kōr.
Ichthyodorulites, ik-thi-ō-dor-ūl-its.
Ichthyology, ik-thi-ol'ō-ji.
Ichthyosaurus, ik-thi-ō-sq'rus.
Icilius, i-kēl'ioos or i-sēl'i-us.
Icolmkill, i-kom-kil'.
Iconium, ē-kō'ni-oom or i-kō'ni-um.
Icosahedron, i-kō-sa-hē'dron.
Ictinus, ik'tin-cos or ik'tin-us.
Idalium, ē-dā'li-oom or i-dal'i-um.
- Idas, ē'das or i'das.
Iddesleigh, id'ez-li.
Ides, idz.
Idiosyncrasy, id-i-ō-sin'kra-si.
Idocrase, i'dō-kraz.
Idomeneus, ē-dō-men-ā'ooos or i-dō-men'ūs.
Idria, id'ri-a.
Idumæa, i-dū-mē'a or id-ū-mē'a.
Idun, ē'doon.
Idyll, i'dil.
If, ēf.
Ifiland, ēf'land.
Ifrét, 'if-rét' (Arab.) or if-rét' (Eng.).
Iglau, ēg'lau.
Iglesias, ig-lā'si-as.
Iglesias de la Casa, ig-lā'si-as dā la ká'sa.
Ignatiev, ig-na'ti-ef.
Ignatius, ig-na'ti-ooos, i-nyā'ti-ooos, or ig-nā'shi-us.
Ignatius de Loyola, i-nyā'ti-ooos dā lō-yō-la.
Ignis fatuus, ig'nis fa'too-ooos, i'nyis fa'too-ooos, or ig'nis fat'ū-us.
Ignorantines, ig-nō-ran'tin-z.
Iguualada, ē-gwa-lā'da.
Iguana, ig-wā'na.
Iguanodon, ig-wān'ō-don.
Iguvium, ē-go'vi-oom or ig-oo'vi-um.
Ijssel, ēs'el.
Iki, ē'ki.
Ilagan, ē-la-gān'.
Île-de-France, ēl-d'frāns'.
Île du Diable, ēl-dū-dē-ab'l'.
Îlerda, ē-lā'da.
Îles du Salut, ēl-dū-sā-lū'.
Îlets, ē-lets'k'.
Îleum, il'i-um.
Îleus, il'i-us.
Îlex, i'leks.
Îlfracombe, il'fra-coom.
Îlhavo, ē-lyā'vo.
Îli, ē'li.
Îlithia, il-lith-ū-i'fa or il-ith-yi-a.
Îllawarra, il-la-wār'ra.
Îlle-et-Vilaine, ēl-ā-vē-lān'.
Îllimani, ē-lyi-mā'ni.
Îllinois, il-lin-oi' or il-lin-oi's'.
Îllora, ē-lyō'ra.
Îlluminati, il-loo-min-ā'ti.
Îllyria, il-lē'ri-a.
Îlmenau, il'men-ou.
Îlo, ē'lō.
Îlocos Norte, ē-lō'kōs nor'tā.
Îlocos Sur, ē-lō'kōs soor.
Îloilo, ē-lō-ē'lō.
Îlorin, ē-lō'rin.
Îlus, ē'loos or il'us.
Îmandra, ē-man'dra.
Îmantophyllum, im-an-tō-āl'um.
Îmatra, ē-mā'tra.
Îmeritia, im-er-ish'i-a.
- Immortalité, êm-mor-tā-li-tā'.
Imola, ē'mō-la.
Impatiens, im-pā'shi-enz.
Impérieuse, am-pā-ri-ēz'.
Impetigo Contagiosa, im-pet-i'gō con-ta-ji-ō'sa.
Imus, ē'moos.
Inagua, ē-nā'gwa.
Inanda, ē-nān-dā.
In articulo mortis, in ar-ti'kō-lō mor'tis or in ar-ti'kū-lō mor'tis.
Incarvillea, in-kar-vil'i-a.
Independencia, ēn-dā-pen-dēn'thi-a.
Indictment, in-dit'ment.
Indigirka, in-di-gir'ka.
Indre, an'dr'.
Indre-et-Loire, an'dr'ā-lwār'.
Indy, an-di'.
Ine, ē'nā.
Ineboli, in-ā-bō'li.
Infantes, ēn-fan'tāz.
Ingemann, ing'e-man.
Ingolstadt, ing'ol-stat.
Innerleithen, in-ner-lē'then.
Innuendo, in-nū-en'dō.
Inowrazlaw, i-nō-vrats'lav.
Inssesores, in-ses-sōr'ez.
Insterburg, in'ster-boorg.
Insubres, in-soob-rāz or in-sub-rēz.
Intaglio, in-tā'lyo.
Interbourse, in-ter-boors.
Intercalary, in-ter-cal-ar-ē.
Interlaken, in-ter-lā'ken.
Intra, in-tra.
Intransigeants, in-tran'si-zhān.
Introit, in-trō-it.
Intussusception, in-tus-sus-sep'shon.
Inula, in-ū-la.
Inveraray, in-ver-ār'i.
Inverloch, in-ver-loch'i.
Involute, in-vōl-ū'k'r.
Io, ē'ō or i'ō.
Iocasta, yō-kas'ta or jō-kas'ta.
Iodic, i-od'ik.
Iolaus, ē-ō-lā'ooos or i-ō-lā'us.
Iolite, i'ol-it.
Ion, ē'ōn or i'ōn.
Ionia, ē-ō'ni-a or i-ō'ni-a.
Ionian, i-ō'ni-an.
Iota, i-ō'ta.
Iowa, i'ō-wa.
Ipecacuanha, ip-i-kak-ū-ā-nya.
Ipek, ē-pek'.
Iphicles, if'i-klāzor if'i-klēz.
Iphicrates, if-ik-ra-tāz or if-ik'ra-tēz.
Iphigenia, if-i-ge-nē'a or if-i-je-ni-a.
Ipiales, i-pi-a'lās.
Ipomœa, ip-ō-mē'a.
Ipsambul, ip-sam-bool'.
Ipsus, ip'soos or ip'sus.

- Iquique, i-ké'ká.
 Iquitos, i-ké'tós.
 Irak Ajemi, é-rak-á'jem-i.
 Irak Arabi, é-rak-á'rab-i.
 Iran, é-ran'.
 Irapuato, é-ra-pwa'tó.
 Irawadi, i-ra-wad'i.
 Irbit, ér-bét'.
 Irenæus, é-ren-á'oos or i-ren-é'us.
 Iriarte, é-ré-á'r'tá.
 Iridescence, ir-i-des'sens.
 Iriga, é-ré'ga.
 Iritis, i-ri'tis.
 Irkutsk, ir-kootsk'.
 Irmin, ér'min.
 Irnerius, ir-ná'ri-oos or ir-né'ri'us.
 Iroquois, ér-ó-kwá'.
 Irredenta, ér-re-den'ta.
 Irish, ír'ish or ir-tesh'.
 Irun, é-roon'.
 Isæus, é-sá'oos or i-sé'us.
 Isandlwana, é-sand-l'-wá'-na.
 Isar, éz'ar.
 Isauria, i-sá'ri-a.
 Isbarta, éz-bar'ta.
 Ischamia, is-ké'mi-a.
 Ischia, is'ki-a.
 Ischl, ish'í.
 Isoghem, é-se-ge-m.
 Iseo, é-sá'ó.
 Iseran, é-s'ran'.
 Isère, é-sár'.
 Isergebirge, é-zer-ge-bir'ga.
 Iserlohn, é-zer-lón'.
 Isernia, é-ser'ni-a.
 Isfahan, is-fa'hán'.
 Ishim, ish'im or ish-ém'.
 Ishmael, ish'ma-el.
 Ishogo, ish-ó'gō.
 Ishpeming, ish'pem-ing.
 Ishtar, ish'tár.
 Iskanderun, is-kan-der-oon'.
 Isla, é'sla.
 Islamabad, is-lám-a-bád'.
 Islay, í'la.
 Isleworth, iz'l-worth or il'-worth.
 Irlington, iz'ling-ton.
 Ismallia, is-ma-el'i-a.
 Ismail Pasha, is-ma-él' pa'-sha.
 Ismene, is-má'ná or is-mé'né.
 Ismid, iz-méd'.
 Isochronism, i-sok'ron-izm.
 Isoclinal Strata, is-ó-klín'-al strá'ta.
 Isoclinic, Isogonic, i-só-klín'ik, is-ó-gon'ik.
 Isocrates, é-só kra-táz or i-sok'ra-téz.
 Isocypanides, i-so-si'an-idz.
 Isodimorphous, i-só-di-mor'fus.
 Isoetes, i-só-e'téz.
 Isola, é'só-la.
 Isola del Liri, é'só-la del lé'ri.
 Isomerism, i-som'er-izm.
- Isomorphism, i-só-mor'-fiz-m.
 Isotropy, i-só'tro-pi or i-só'trop'i.
 Isouard, é-soo-ár'.
 Ispahan, is-pa-hán'.
 Israfil, is-ra-fél'.
 Issik-kul, is-ik-kool'.
 Issolre, éz-swár'.
 Issoudun, éz-soo-dún'.
 Issy, éz-sé'.
 Istakhr, is-tach'r.
 Istambul, is-tam-bool'.
 Isthmia, isth'mi-a.
 Iswar Chandra, é'swár chun'dra.
 Itacoatiara, é-ta-kwa-ti-á'-ra.
 Itacolumite, it-a-kol'ú-mít.
 Itajahy, é-ta-zhá'i.
 Ithaca, ith-á-ka.
 Ithome, ith-ó'má or ith-ó'mé.
 Ito, é'to.
 Ittu, it'too.
 Iturea, i-too-rá'a or it-ú-ré'a.
 Itzehoe, it'sá-hō.
 Iuka, i-ú'ka.
 Iulus, yoo'loos or yoo'lus.
 Ivanovo - Vosnesensk, é-van-ó vo-vos-nés'ensk.
 Iveagh, í'va.
 Ivinghoe, í'ving-hō.
 Iviza, é-vé'tha or é-vé'sa.
 Ivrea, é-vré'a.
 Ivory-la-bataille, é-vri-la-ba-tá'ly'.
 Ivory-sur-Seine, é-vri'-sūr-sán'.
 Ixelles, é-sel'.
 Ixiolirion, iks-i-o-lé'ri-on.
 Ixion, iks-é'on or iks-i'on.
 Ixora, iks-ó-ra.
 Izdubar, iz-doo-bár'.
 Izhevsk, izh-evsk'.
 Izmailovo, iz-mi-ló'vō.
 Izucar, é-thoo'kar.
 Izu-no-shichi-to, i-zoo-nō-shé-ché'to.
 Izyum, iz-yoom'.
- Jabbok, yab'bók or jab'bok.
 Jabesh-Gilead, yá-bash'-gil-é-ad' or ja-besh'-gil-yad'.
 Jabiru, jab'i-roo.
 Jabneel, yib-nál' or jab-nél'.
 Jaborandi, jab-ó-ran'di.
 Jaca, há'ka.
 Jacamars, jak'am-arz.
 Jacaranda, ja-ka-ran'da.
 Jacare, jak'ar-á.
 Jacmel, zhák-mel'.
 Jacobbi, ya-kó'bi.
 Jacobins, jak'ó-binz or zha-ko-ban'.
 Jacobsdal, yak'obz-dál.
 Jacobsen, yak'ob-sen.
 Jaopone da Todi, ya-kō-pō'ná da tō'di.
 Jacotot, zhá-kō'tó'.
 Jaquard, zhá-kár'.
- Jacquerie, zhák-ré'.
 Jacquinia, jak-kwé'ni-a.
 Jadeite, jád'it.
 Jaen, ha-en'.
 Jafarabad, ja-far-á-bád'.
 Jaffna (Jaffnapatam), jaf'-na (ja'fa-na-pat-um).
 Jagadhri, ja'ga-d'hri.
 Jagannath, jug-un-náth'.
 Jagatai, ja-ga-tí'.
 Jagellones, ja-gi-el'lonz (properly ja-gi-el-lon'ka).
 Jägerndorf, yá'gern-dorf.
 Jägersfontein, ya-gers-fon-tin'.
 Jaguar, jak'war.
 Jahn, yán'.
 Jahvist, já'vist.
 Jainism, jin'izm.
 Jaintia, jin'ti-a.
 Jaipur, ji-poor'.
 Jaisalmir, ji-sal-mér'.
 Jajce, yit'se.
 Jakobsbavn, yá'kobs-havn.
 Jalalabad, jul-al-á-bád'.
 Jalalpur, jul-al-poor'.
 Jalandhar, jal-un-d'hur.
 Jalapa, ha-lap'a.
 Julau, ja-lán'.
 Jalisco, ha-lis'ko.
 Jalna, jul'na.
 Jalpaiguri, jul-pi'gur-i.
 Jamalpur, jum-al-poor'.
 Jambu - dvipa, jum-boo-dvé'pa.
 Jambusar, jum-boo'sur.
 Jamkhandi, jum-k'hán'di.
 Jammu, jum-moo'.
 Jamnotri, jum-not'ri.
 Jamrud, jum-rood'.
 Jamsetjee Jeejeebhoy, jam'set-jé-jé-jé'b'hoi.
 Jamshid, jam-shéd'.
 Janet, zhá-ná'.
 Jang, Bahadur, jung, ba-há'door.
 Janiculum, ya-ni'koo-loom or jan-ik'ú-lum.
 Janina, ya-né'na.
 Janiuy, ha-ni-wi'.
 Janizaries, jan'i-za-réz.
 Jan Mayen, yan mi'en.
 Jannes, Jambrez, yan-nás', yam-brás'; or jan-néz', jam'bréz; or jan-néz', jam'burz.
 Jansenism, jan'sen-izm.
 Janson, yan'son.
 Janssen, yan'sen.
 Janssens van Nuyssen, yan'sens van noi'sen.
 Januarius, ya-noo-á'ri-oos or jan-ú-á'ri-us.
 Janus, Jana, yá'noos, yá'-na; or já'nus, já'na.
 Jaora, já'ó-ra.
 Japheth, yá'fet or jaf'eth.
 Japura, ha-poo'ra.
 Jarkent, yar-kent' or yar-kend'.
 Jarnac, zhár-nak'.
 Jaromierz, yá'rō-mérts.
 Jaroslav, yá'rō-slav.
- Jaseur, zha-ser' (Fr.) or já'ser (Eng.).
 Jasher, yá-shar' or já'sher.
 Jashpur, jush-poor'.
 Jasmin, zhás-man'.
 Jason, yá'son or já'son.
 Jaszapati, yas'ó-po-ti.
 Jaszbereny, yas-ber-eny'.
 Jasz - Nagykun - Szolnok, yas-noj'koon-sol-nok'.
 Játaka, já'ta-ka.
 Jativa, há'ti-va.
 Jauer, yau'er.
 Jaunpur, ján-poor'.
 Jauréguiberry, zhó-rá-gé-ber-ri'.
 Jaurès, zhó-rá'.
 Javea, ha-vá'a.
 Jaworow, ya-vor'ov.
 Jaworzno, ya-vor'zno.
 Jaxartes, yaks-ar'táz or jaks-ar'téz.
 Jayadeva, já-ya-dá'va.
 Jazyges, yáz'ig-áz or jaz'-ij-éz.
 Jeanne d'Arc, zhan-dark'.
 Jeannette, ja-nét'.
 Jebali, jeb-il'.
 Jehangir, ja-hán'gér.
 Jehoiachin, y'-hō-yá-kén' or ji-hō'ya-kin.
 Jeholada, y'-hō'yá-dá or je-hō'ya-da.
 Jehoiakim, y'-hō'yá-gém or ji-hō'ya-kim.
 Jehol, jé-hól'.
 Jehoshaphat, y'-hō'shā-fát or yi-hō'sha-fat.
 Jehovab, je-hó'va.
 Jehu, yá'hoo or jé'hoo.
 Jejunum, je-jū-num.
 Jellachich, jel'ach-ich.
 Jemappes, zhá-map'.
 Jena, yá'na.
 Jenatsch, yá-nach'.
 Jenghiz Khan, jen'giz k'hán.
 Jensen, yen'sen.
 Jephthah, yif'thách' or jef'tha.
 Jerablus, jer-a-bloos'.
 Jeremiah, yi-r'-m'yá'hoo or jer-e-mi-a.
 Jérémie, zhá-rá-mé'.
 Jerez de la Frontera, há'reth dá la fron-tá'ra.
 Jerez de los Caballeros, há'reth dá lós ka-ba-lyá'rōs.
 Jerichau, yá'ri-kau.
 Jericho, y'-ré-chō' or jer'iko.
 Jeroboam, yá-rá-b'ám or jer-ó-b'ám.
 Jerome, jer'óm.
 Jervaulx, zher-vó'.
 Jeshurun, y'-shoo-roon'.
 Jesl, yá'si.
 Jessore, jes-sór'.
 Jeune, zhen.
 Jeunesse Dorée, zhen-es' dó-rá'.
 Jeypore, ji-poor'.

Appendix of Pronunciation.

- Jezreel, yiz'r^é-el, or jez-ré.
 Jhalawar, j'hul-u-wär
 Jhang, j'hung.
 Jhansi, j'hän'si.
 Jhelum, j'hä'lum.
 Jhering, yä'ring.
 Jibuti, zhé-bu'ti.
 Jijona, hi-hó'na.
 Jilolo, ji-ló'lo.
 Jimena de la Frontera, hi-má'na dá la fron-tá'ra.
 Jiron, hi-rón'.
 Jitomir, zhi-tó-mér'.
 Jivaros, hí'vá-rós.
 Jizzak, jit'sak.
 Jmudes, zh'moodz.
 Joachim, yó'a-kim or yó'a-chim.
 Joachimsthal, yó-a-chim-z-tál'.
 Joan, jón or jo'an.
 Joannes Damascenus, yo-an nêz da-mas-ká'noos or jo-an nêz da-mas-sé-nus.
 Joash, Jehoash, y'hó'ášh, jó'ash, or ji-hó'ash.
 Jocelin, jos'el-in.
 Jodel, yó'del.
 Jodelle, zhó'del'.
 Jodhpur, jód'h-poor'.
 Joel, yó-ál' or jó'el.
 Johannesburg, yó-han'nés-boorg.
 Johannisberg, yó-han'nis-berg.
 Johor, jó-hór'.
 Joigny, zhwa-nyí'.
 Joinville, zhwan-vél'.
 Jókai, yó'ki.
 Jokjokarta, jok-jó-kár'ta.
 Jomini, zhó-mi-né'.
 Jonas, yó'nas.
 Jonicères, zhon-si-ár'.
 Jongleurs, zhón-gler'.
 Jönköping, yen-chep'ing.
 Jonquill, jon'quill.
 Jordaens, yor'danz.
 Jörgensen, yer'gen-sen.
 Jornandes, Jordanis, yor-nan'dáz, yor-dá'nis.
 Josephstadt, yó'sef-stat.
 Joséphine, zhó-se-fén'.
 Josephus, yó-sá'foos or jo-sé'us.
 Jouffroy, zhoo-frwá'.
 Jouffroy d'Abbans, zhoo-frwá' dab-ban'.
 Journal des Débats, zhoor-nal' dá dá-bá'.
 Jovellanos, ho-ve-lyá'nós.
 Jovian (Jovianus), jó'vi-an (yó-vi-á'nóos).
 Juan Fernandez, hwan fer-nan'dáth.
 Juarez, hoo-á'reth or hwa'-reth.
 Juba, joo'ba or yoo'ba.
 Jucar, hoo'kar.
 Judah ha-Levi, yoo'da ha-lá'vi, or yoo'da ha-lá-vé'.
 Juel, yoo'el.
 Juglandee, jug-lan'di-i.
 Jugurtha, yoo-goor'ta or joo-gur'tha.
 Ju-jitsu, joo'jit-soo.
 Jujuy, hoo-hwé'.
 Jülg, yülg.
 Julia Gens, yoo'li-a genz or joo'li-a jenz.
 Jüllich, yü'lich.
 Julien, zhü-li-an'.
 Julier, zhü-li-á'.
 Julius (Iulus), joo'lus (é-oo'-loos).
 Jumet, zhü-má'.
 Jumièges, zhü-mi-áz'h'.
 Jumilla, hoo-mé'lya.
 Jumna (Jumuna), jum'na (ya-moo'na).
 Junagarh, joo-na-gur'.
 Juneau, joo-nó' or zhü-nó' (Fr.).
 Jungbunzlau, yoong-boonts'lau.
 Jungermannia, joong-er-man'i-a.
 Jungfrau, yoong'frau.
 Junia Gens, yoo'ni-a genz or joo'ni-a jenz.
 Junker, yoon'ker.
 Juno, yoo'nó' or joo'nó.
 Junot, zhü-nó'.
 Juntá, hoon'ta.
 Jura (Hebrides), joo'ra.
 Jura (France), zhü-ra'.
 Jurassic, joo-ras'sik.
 Jurien de la Gravière, zhü-ri-an' d'i'-la grá-vi-ér'.
 Jurieu, zhü-ri-e'.
 Jusserand, zhü-se-rán'.
 Jussieu, zhü-si-e'.
 Juste, zhüst.
 Justinus, yoo-s-té'noos or just-tin'us.
 Jüterbog, yü'ter-bog.
 Jyotisha, jyó'ti-sha.
 Kaaba, k'a'ba.
 Kaalund, kó'loon.
 Kaap, káp.
 Kabir, ka-bér'.
 Kabraji, ka-bra-jé'.
 Kabul, ká'bool.
 Kämpferia, kámp-fé'ri-a.
 Kafristan, ká-fr-i-stán'.
 Kagera, ka-gá'ra.
 Kagoshima, ká-gó-shé'ma.
 Kagu, ka'goo.
 Kahnis, ká'nis.
 Kalapoi, ki-a-pó'i.
 Kai-feng-fu, ki-feng-foo'.
 Kallas, ki-las'.
 Kaipara, ki-pá'ra.
 Kaiping, ki-ping'.
 Kalra, kí'ra.
 Kairana, ki-rá'na.
 Kairwan, kí-rwán'.
 Kaisarieh, ki-sar-é'a.
 Kaiserlautern, kí-ser-lau'tern.
 Kaiser Wilhelm, kí'ser vél'helm.
 Kaithal, ki-t'hul'.
 Kakapo, ka-ka-pó' or ka-ka-pá'ó.
 Kalahandi, ká-la-han'di.
 Kalanchoe, ka-lan-chó'é.
 Kalatch, ka-lach'.
 Kalbe, kal'ba.
 Kale-i-Sultanieh, ka-lá'-i-sool-ta-né'á.
 Kalgoorlie, kal-goor'li.
 Kalidasa, ka-li-dá'sa.
 Kallmo, ka-lim'no.
 Kalingapatam, ka-lin'ga-put-un.
 Kalisz, ká'lish.
 Kalladakurichi, kal-la-dak'ur-i-chi.
 Kalna, kul'na.
 Kalnoky, kal-nó'ki.
 Kalocsa, ko-loch'o.
 Kalpasútras, kal-pa-soo'tras.
 Kalubich, ka-loo-bësh'.
 Kalusz, ka'loosh.
 Kamadeva, ká-ma-dá'va.
 Kamchatka, kam-chat'ka.
 Kamenets-Podolsk, ká-men-ets-po-dolsk'.
 Kamenskaya, ka-men-ská'ya.
 Kamenz, ká'ments.
 Kaministiquia, ka-min-is-té'kwi-a.
 Kamishin, ká-mi-shin'.
 Kamrup, kam-roop'.
 Kamthi, kam'thi.
 Kanagawa, ka-na-gá'wa.
 Kanakas, ka-nak'as.
 Kanatur, ka-na-noor'.
 Kanaris, ka-na-rés'.
 Kandhia, kan'dhi-a.
 Kanem, ká'nem.
 Kangchanjunga, kang-chan-jung'a.
 Kanisza, kó'né-sho.
 Kaolin, ká'o-lin.
 Kapellmeister, ka-pel'míster.
 Kaposvar, ka-posh-vár'.
 Kaproncza, ko-pront'so.
 Kapunda, ka-pun'da.
 Kapurthala, ka-poor'tha-la.
 Karachev, ka-ra-chev'.
 Karachi, kur-á'chi.
 Karaites, kár'a-its.
 Kara-kalpaks, ka-ra-kal'paks.
 Karasu-Bazar, ka-ra'soo-ba-zár'.
 Karategin, ka-ra-tá-gén'.
 Karczag, kor-tsog'.
 Karenni, kar-en-né'.
 Kargalik, kár-gal-ék'.
 Karloozza, kor-ló'tso.
 Karlskrona, karls-kró'na.
 Karlsruhe, karls-roo'a.
 Karmó, karm'é.
 Karolinenthal, ka-ro-lén'en-tál.
 Karolyvaros, ko-ró-lyé'-vo-rósh'.
 Kartarpur, kur-tar-poor'.
 Kartikeya, kur-ti-kí'a.
 Karur, kur-oor'.
 Karwar, kur-wár'.
 Karwin, kar-vín'.
 Kasonlik, kaz-an-lik'.
 Kaschau, ká'shau.
 Kas-ganj, kás-gunj'.
 Kashima, ka-shé'ma.
 Kashmir, kash-mér'.
 Kashubish, kash-oob'ish.
 Kasimbazar, ka-sim-ba-zár'.
 Kasimov, ka-sim-ov'.
 Kasipur, ká-si-poor'.
 Kaskaskia, kas-shá'ki-a.
 Kasr-el-Kebir, kasr-el-ke-bér'.
 Kassaba, kas-sá'ba.
 Kassassin, kas-as-sén'.
 Kastamuni, kas-ta-moo'ni.
 Kathiawar, ka-t'hi-a-wár'.
 Kathimeln, ka-zi-mén'.
 Katsena, kat-ten'a.
 Kattimundoo, kat-ti-mun'doo.
 Kattowitz, kat'to-vits.
 Katwijk, kat'wik.
 Katayana, kat-ya-yá'na.
 Katydid, ká'ti-did.
 Katzbach, kás'bach.
 Kaufbeuren, kauf'boi-ren.
 Kaulbach, kaul'bach.
 Kaunitz, kau'nits.
 Kavanagh, kav'an-a.
 Kazanskaya, ka-zan-ski'a.
 Keckemet, kech'kem-át.
 Kodah, k'-'da'.
 Keewatin, ké-wá'tin.
 Keil, ká.
 Keil, kí.
 Kekulé, kek-oo-lá'.
 Kelantan, k'-lan'tan.
 Kelat-i-Nadiri, ke-lát-i-na'di-ri.
 Kenosha, ken-ó'sha.
 Keokuk, ké'o-kuk.
 Kerbela, ker-bá'la.
 Kerguelen, ker-g'-lan'.
 Kermanshab, ker-man-sha'.
 Kérrouaille, kár-wá'lyé'.
 Kerulen, ké'ool-en.
 Keszthely, keest-he'lyé'.
 Kewanee, ki-wá'né.
 Khabarovsk, ka-bad-ovsk'.
 Khabur, ka-boor'.
 Khaibar, kí'bar.
 Khairabad, kí-rá-bád'.
 Khairagarh, kí-rá-gur'.
 Khair-ed-din, kí-red-dén'.
 Khairpur, kí-r-poor'.
 Khama, ká'ma.
 Khammurabi, kam-moo'-ra-bi.
 Khandwa, k'haund'wa.
 Khan-Fengri, kán-teng'ri.
 Kharkov, kar-kov'.
 Khartum, kar-toom'.
 Khatmandu, k'hat-man-doo'.
 Khiva, kí'va.
 Khopff, k'hopf.
 Khojak, kó'jak.

Appendix of Pronunciation.

V

Khorassan, kō-ras-sān'.	Kohl-rabi, kōl'-ra-bi.	Kwei-chou, kwā-chau'.	Landskron, lands'krōn.
Khulna, k' hooi'na.	Kohlrausch, kōl'raush.	Kyrie Eléison, kē-ri-ā'e-lā'-i-son or kē-ri-ā'e-l'i-son.	Landskrona, lands'krō'na.
Khuzistan, kooz-i-stān'.	Kolapur, kō-la-poor'.		Landwehr, land'vār.
Khvaylinsk, k'-val-ēnsk'.	Kolarian, kō-lā'-ri-an.		Lanfranco, lan-fran'ko.
Kiakhta, kyach'ta.	Kolbe, kōl'ba.	Laaland, lā'land or lō'land.	Lange, lang'a.
Kiang-si, ki-ang-sē'.	Kolin, kō-lēn'.	Labadie, la-ba-dē'.	Langebek, lang'a-bek.
Kiekie, ki-ē'ki-ē.	Kölnische Zeitung, kel'-nish-a tsi'toong.	Labarum, lā'ba-room.	Langeland, lang'a-land.
Kiel, kēl.	Kolomea, kō-lo-mā'a.	Labdacus, lab'da-koos or lab'da-kus.	Langenbeck, lang'en-bek.
Kielce, kyelt'sa.	Kolozsvár, kō-lōsh-vār'.	Labiata, la-bi-ā'ti.	Langenbielau, lang-en-bē'-lau.
Kiepert, kē'pert.	Kolyma, kō-lē'ma.	Labiche, la-bēsh'.	Langendijk, lang'en-dik.
Kierkegaard, kyār'k'-gōr.	Komarom, kō-mā-rom'.	Labienus, la-bi-ā'noos or la-bi-ē'nus.	Langendreer, lang'en-drār.
Kiev (Kieff), ki-ev' (ki-ef').	Konieh, kō-ni-ā.	Lablache, la-blāsh'.	Langensalza, lang'en-zal-tsa.
Kilauea, ki-lau-ā'a.	Königgrätz, kē'nig-grāts.	Labori, la-bō'ri.	Langiewicz, lan-gyā'vich.
Kilima-Njaro, ki-lē-man-jā'ro.	Königinhof, kē'nig-in-hōf.	Labouchere, la-boo-shār'.	Langres, lān'gr'.
Kilwa-Eiswani, kil'wa-ki-si-wā'ni.	Königshütte, kē'nigz-hüt-t'.	Laboulaye, la-boo-lā'.	Lang-son, lang-son'.
Kilwa-Kivinje, kil'wa-ki-vin'ja.	Königssee, kē'nig-zā or kē'nig-zā.	Labourdonnais, la-boo-don-nā'.	Languedoc, lān-g'-dok'.
Kinkajou, kin'ka-joo.	Königstuhl, kē'nigz-stool.	La Bruyère, la-broo-yār'.	Langur, lan'goor.
Kiöge, ki-ē'gā.	Königswart, kē'nigz-vārt.	La Caille, la-kāly'.	Lankavatāra, lan-kā-vā-tā'ra.
Kloto, kē-ō'tō.	Konskie, kons'kyā.	La Calprenède, la-kal-pr'-nād'.	Lannes, lan.
Klowas, ki-ō-wāz.	Konstanz, kon'stants.	Lacépède, la-sā-pād'.	Lannion, lan-ni-on'.
Kirghiz, kir-gēz' or kār-gēz'.	Kootenay, koo-t'-nā'.	Lachaise, la-shāz'.	Lanthanum, lan'than-um.
Kirjath-jearim, kir-yath-y'-ā-rēm' or kir-jath-jē'a-rem.	Köpenick, kē'pen-ik.	Lachish, lā-kēsh' or lā'-kish.	Lanza, lan'tsa.
Kirjath-sepher, kir'yath-sā'fer or kir'yath-se'fer.	Köprüllü, kō-prē-lü.	La Condamine, la-kon-da-mēn'.	Lanzarote, lan-tha-rō'tā.
Kirkcudbright, kir-koo'bri.	Kordofan, kor-dō-fān'.	Lacretelle, la-kr'-tel'.	Lanzi, lan'tsi.
Kirombo, kē-rom'bo or kē-room'ba.	Körner, kēr'ner.	Lacroix, la-krwā'.	Laog, lau-āg'.
Kirschwasser, kirsh'vas-ser.	Korsör, kōr'ser.	Lacryma Christi, la'kri-ma kris'ti.	Lao-tse, la-ō'ts'.
Kiryu, kir'yoo.	Kosciuszko, kosh-tsysh'ko.	Lactuca, lak-too'ka.	Lapageria, la-pa-jē'ri-a.
Kisfaludy, kish-fo-loo'd'.	Köszeg, kes-eg'.	Ladoga, lad'ō-ga.	Laparotomy, lap-a-rot'o-mi.
Kishangarh, kish-un-gur'.	Köthen, kē'ten.	Ladrones, la-drō'nās.	La Paz, la-path'.
Kishinev, kish-in-ev'.	Kotzebue, kots'boo or kots'-a-boo.	Læstrygones, lā-strig'o-nēz.	La Pérouse, la-pā-rooz'.
Kizlyar, kiz'l-yār'.	Krakatoa, kra-ka-tō'a.	La Farina, la-fa-rē'na.	Lapeyrousie, la-pā-rooz'i-a.
Kiskunmajsa, kish-koon-mā'sha.	Kraszewski, krash-ev'ski.	Lafitau, la-fi-tō'na.	Lapithæ, la'pi-thā or la'pi-thi.
Kismayu, kis-mā'yoo.	Kremenichug, krem-en-choog'.	La Fontaine, la-fon-tān'.	Laplace, la-plās'.
Kisujszallas, kish-oi-sāl-lāsh'.	Kriegspiel, krēg'spēl.	La Fuente, la-foo-en'tā.	La Plata, la-plā'ta.
Kiung-chow, ki-oong-chau'.	Krimmitschau, krim'mit-shau.	Lagerlöf, la-ger-lef.	La Porte, la-pōrt'.
Kiushiu, kyoo'shyoo.	Kropotkin, krō-pot'kin.	Lagerstromia, la-ger-strem'i-a.	Lappenberg, lap'en-berg.
Kivu, kē'voo.	Kruger, kroog'er.	Lagrange, la-grānj'.	Laprade, la-prād'.
Kizil-Irmak, kiz'il-ēr-mak'.	Krummacher, kroom'ma-cher.	La Grita, la-grē'ta.	Laraiche, la-rāsh'.
Kizlyar, kiz'l-yār'.	Kuala Lumpur, kwa'la loom'poor.	La Guayra, la-gwī'ra.	Laramie, lar'a-mē.
Kjerulf, kyār'oölf.	Kuala Selangor, kwa'la s'-lang'ōr.	La Habana, la-a-bā'na.	Lareau, la-rō'.
Kjölen, kyē'en or chel'en.	Kublai Khan, koob-li' chün.	Laharpur, la-har-poor'.	Laredo, la-rā'do.
Kladderadatsch, klad'der-a-dach.	Kuch Behar, kooch bi-hār'.	Lakhimpur, la-k'him-poor'.	Lares, la'rāz or lā'rēz.
Klagenfurt, klā'gen-foot.	Kuenen, kü'nen.	La Louvière, la-loo-vi-ār'.	Lari, la'rē.
Klaproth, klap'rōt.	Kuen-lun, kwen-loon'.	Lamachus, la-ma-choos.	Larivey, la-ri-vā'.
Klausthal, klaus'tāl.	Kulasekharapatnam, koo-la-sā-k'hā-ra-put'num.	La Marmora, la-mar'mo-ra.	Larkhana, lar-k'hā'na.
Kleist, klist.	Kulturkampf, kool-toor'-kampf.	Lambayeque, lam-bi-ā'kā.	La Rochefoucauld, la-rōsh-foo'fō'.
Klosterneuburg, klos-ter-noi'boorg.	Kummel, küm'el.	Lamego, la-mā'go.	Larochejaquelein, la-rōsh-zha-k'-lan'.
Knobel, knō'bel.	Kunszentmarton, koon-sent-mār'ton or koon-sent-mār'tony'.	Lame Libranchiata, la-mel-li-brang-ki-ā'ta.	Larousse, la-roos'.
Knout, knaut.	Kupferschiefer, koop'fer-shē-fer.	Lammergeier, lem-mer-gi'-er.	Larrey, lar-rā'.
Koblenz, kō'blents.	Kuroki, kūrō'ki.	Lan-chou-fu, lan-chau-foo'.	Laryngoscope, la-ring'go-skōp.
Koch (people), köch.	Kuropatkin, koo-ro-pat'kin.	Lanciani, lan-chi-ā'ni.	Larynx, lar'inks.
Koch (person), koch.	Kursk, koorsk.	Lanciano, lan-chi-ā'no.	Las Casas, las-kā'sas.
Kochi, kō'chi.	Küstlin, küs-trēn'.	Landerneau, lān-der-no'.	Las Cases, las-kāz'.
Kodungalur, kō-doong-a-loor'.	Kutailah, koo-tī'a.	Landánáma-Bók, land-nā'-ma-bōk.	Lascelles, las'sels.
Koesfeld, kes'felt.	Kuyper, koi'per.	Landsberg, lands'berg.	Lasco, las'ko.
Koh-i-nur, kō-i-noor'.	Kwang-chou-wan, kwang-chau-wān'.	Landsgemeinden, lands-gem'in'den.	Lasiopetalum, las-i-ō-pet'-alum.
Kohistan, kō-i-stān'.	Kwang-tung, kwang-toong'.	Landshut, lands'hoot.	
Köhler, kē'ler.		Landsknechte, lands-knech'ta.	
		Landsturm, land'stoorm.	

Las Palmas, las-pál-mas.
 Lassalle, las-sal'.
 Lasthenia, las-thé'ni-a.
 Las Vegas, las-vá'gas.
 Latacunga, la-ta-kung'a.
 Latakia, la-ta-ke'a.
 Lateau, la-tó'.
 Lathe, láth.
 Lathraea, lath-ré'a.
 Lathyrus, lath'i-rus.
 Latini, la-té'ni.
 Latium, lá'ti-oom or lá'shi-um.
 Latona, la-to'na.
 La Tour d'Auvergne, la-toor'-do-ver'ny'.
 Latreille, la-trá'yé'.
 Latude, la-túd'.
 Lauban, lau-ban.
 Laube, lau'ba.
 Lauda, lau'da.
 Lauder, lá'dér.
 Laudon, lau'don.
 Lauenburg, lau'en-boorg.
 Laun, laun.
 Laurinaceæ, lar-in-á'si-i.
 Lurahütte, lau'ra-hüt-ta.
 Laurrelia, lá-ré'li-a.
 Laurentia, lá-ren'shi-a.
 Laurentum, lau-ren'toom or lau-ren'tum.
 Laurier, lá-ri-á'.
 Laurium, lau'ri-oom or lá'ri-um.
 Laurustinus, lá-rus-ti'nus.
 Laurvik, laur'vik.
 Lausanne, lá-zan'.
 Lauterbrunnen, lau'ter-broon-en.
 Lavagna, la-va'nya.
 La Vallière, la-vá-yi-ár'.
 Lavaur, la-vór'.
 Laveleye, la-vé-lá'.
 La Villemarqué, la-vél-mar-ka'.
 Lavissee, la-vés'.
 Lavoisier, la-vwá-si-á'.
 Lawes, láz.
 Lawfeld, lá'velt.
 Layamon, lá'a-mon.
 Lazaretto, lad-za-ret'to or laz-a-ret'to.
 Lebedin, le-bá-dén'.
 Lebedyan, le-bá-dyan'.
 Letouff, l'é-bef'.
 Lebossu, l'é-bos-sú'.
 Lebrija, lá-bré'ha.
 Le Brun, l'é-brun'.
 Le Caron, l'é-ka'ron.
 Lecce, lech'chá.
 Lecco, lek'ko.
 Lech, lech.
 Lechler, lech'ler.
 Lechithin, lé'sith-in.
 Leclaire, l'é-klár'.
 Leclercq, l'é-klérk'.
 Lecoq, l'é-kok'.
 Le Conte de Lisie, l'é-kont-dé-lá'.
 Lecouvreur, l'é-koo-vrer'.
 Lecythidaceæ, lé-sith-i-dá-ci-i.
 Ledeberg, lá'dé-bärg.

Ledochowski, lá-dó'chov-ski.
 Ledru-Rollin, led-rú'-rol-lan'.
 Leer, lár.
 Leeuw, lye'in.
 Lefebvre, l'é-fá'vré'.
 Lefort, l'é-fór'.
 Le Gallienne, l'é-gal-li-en'.
 Legato, le-gá'to.
 Legazpe, lá-gath'pé.
 Legendre, l'é-zhan'dré'.
 Legnago, lá-nyá'go.
 Legnano, lá-nyá'no.
 Legouvé, l'é-goo-vá'.
 Legros, l'é-gró'.
 Legua, le-gi'a.
 Lehi, lá.
 Lehe, lá'ha.
 Lehmann, lá'man.
 Leibniz, lib'nits.
 Leicester, les'ter.
 Leichhardt, lich'hart.
 Leighton, lá'ton.
 Leiningen, lin'ing-en.
 Leinster, lin'ster or lén'ster.
 Leipzig, lip'tsig.
 Leitha, lí'ta.
 Leitmeritz, lit'mer-its.
 Leit-motif, lit-mo-téf'.
 Leitomischi, lit'o-mish-í.
 Leiva, lá'i-va.
 Leixões, lá'sho-anz.
 Lei-yang, lá-yang'.
 Leleges, lé'lé-gáz or lé'lé-géz.
 Lelewel, lel'év-el.
 Lemaitre, l'é-má'tré'.
 Lemberg, lem'berg.
 Lemercler, l'é-mer-si-á'.
 Lemoine, l'é-mwán'.
 Lemoyne, l'é-mwán'.
 L'Empereur, lan-p'-rer'.
 Lempière, lem-pre-ár'.
 Lemures, lá'moo-rázor lem'-ürz.
 Lema, lá'na.
 Lenbach, len'bach.
 Lenclos, lan-klo'.
 Lenczyca, len-chit'sa.
 Lenormant, l'é-nor-man'.
 Lenôtre, l'é-nó'tré'.
 Lens, lan.
 Lenticulariaceæ, len-ti-bü-lar-i-á'si-i.
 Lenz, lents.
 Leoben, lá-o'bén.
 Leobschütz, lá'op-shüts.
 Leochares, lá-o'cha-ráz or lé-o'ka-réz.
 Leon, lá-on'.
 Leonardo da Vinci, lá-o-nar'do da vin'chi.
 Leonforte, lá-on-fór'tá.
 Leoni, lá-ó'ni.
 Leonidas, lá-on-i-das or lé-on-i-das.
 Léon Pinelo, lá'on pi-ná'lo.
 Leopardi, lá-o-par'di.
 Leopoldville, lé-o-pöld-vil.
 Leotychides, lá-o-tü'chi-dáz or lé-o-ti'ki-déz.
 Leovigild, lá-o-wi-gild.

Lepidodendron, lep-i-do-den'dron.
 Lepidosiren, lep-i-do-si-ren.
 Le Play, l'é-plá'.
 Lepontine, le-pon'tin.
 Lepsius, lep'si-ous.
 Leric, ler'i-chi.
 Lerida, lá'ri-da.
 Lerins, l'é-ran'.
 Lermontoff, ler-mon-tof'.
 Lernaïda, ler-né'i-di.
 Leroux, l'é-roo'.
 Leroy-Beaulieu, l'é-rwa-bó-li-é'.
 Lerwick, ler'ik or ler'wik.
 Lesage, l'é-sáz'.
 Leschenaultia, lesh-en-ál'-si-a.
 Lescot, les-kó'.
 Lesghians, lez'gi-anz.
 Lesina, lá-sé'na.
 Leskovac, les-kó'vats.
 Lespinnasse, les-pi-nas'.
 Lesseps, les-seps'.
 Leste, les'ta.
 Le Sueur, l'é-sü'er.
 Lethe, lá'thá or lé'thé.
 Leti, lá'ti.
 Leto, lá'to or lé'tó.
 Lettres de Cachet, let'tré-dé-ka'sh-á'.
 Leucine, lü'sén.
 Leucippus, lev-kip'poos or lü-sip'pus.
 Leucisus, lü-sis'kus.
 Leuckart, loi'kart.
 Leucocoryne, lü-kó-kor'in.
 Leucocythæmia, lü-ko-si-thé-mi-a.
 Leucoium, lü-kó'i-um.
 Leucospermum, lü-ko-sper-mum.
 Leuctra, lük'tra or levk'tra.
 Leukas, lü'kas or lev'kas.
 Leukerbad, loi'ker-bat.
 Leuthen, loi'ten.
 Leutschau, loi'chau.
 Leutze, loi'tsa.
 Levailant, l'é-vi-yán'.
 Levant et Couchant, l'é-van'-á-koo-shan'.
 Leveche, lá-vá'chá.
 Levée, lev'é.
 Levenshulme, lev'enz-hulm.
 Levita, le-vé'ta.
 Levuka, le-vo'ka.
 Lewald, lá'vált.
 Leycesteria, lis-té'ri-a.
 Leyden, lí'den.
 Leyds, lidz.
 Leys, lis.
 Leyssera, lis'ser-a.
 Leyte, lá'tá.
 Leze-majesty, léz-maj'es-ti.
 Lhassa, lá'sa.
 Lherzoltte, lerz'ó-lit.
 L'Hôpital, lé-pi-tal'.
 Li, lé.
 Lia Fail, li-a-fál'.
 Liana, lé-á'na.

Libanius, li-bá'ni-ous or li-bá'ni-us.
 Libau, lé'bau.
 Libavius, li-bá'vi-ous.
 Libellatici, li-bel-lá'ti-ki o li-bel-lá'ti-si.
 Libellula, li-bel'lu-la.
 Libertad, li-ber-tád'.
 Liberum Veto, lib'er-um vé'to.
 Libitina, li-bi-té'na or li-bi-ti'na.
 Libocedrus, lib-o-séd'rus.
 Libourne, li-boorn'.
 Libreville, lé-bré-vél'.
 Libri-Carrucci, lé'bri-kar-roo'chi.
 Licata, lé-ka'ta.
 Lichen, lí'ken or lich'en.
 Lichtenberg, lich'ten-berg.
 Lichtenstein, lich'ten-stin.
 Licinius, li-ké'ni-ous or li-si'ni-us.
 Licuala, li-kü-á'la.
 Lido, lé'do.
 Liebermann, lé'ber-man.
 Liebig, lé'big.
 Liebknecht, lé'b'knecht.
 Liebrecht, lé'b'recht.
 Liechtenstein, lich'ten-stin.
 Liège, lé-ázh'.
 Liegnitz, lég'nits.
 Lierro, lí-ár'.
 Ligo, lé-gá'o.
 Ligne, lé'nyé'.
 Lignum Vitæ, lí'nyoom vé'tá or lig'num ví'ti.
 Ligny, lé-nyí'.
 Li Hung Chang, lé-hoong-chang'.
 Limfjord, lem'fyor.
 Liliacæ, lí-li-á'si-i.
 Liliuokalani, lí-li-oo-o-ka-lá'ni.
 Lille, lé'lí.
 Lillebonne, lé'l-bon'.
 Lima, lé'ma.
 Limassol, lé-mas-sol'.
 Limborch, lim'borch.
 Limnæus, lin-né'us.
 Limnanthemum, lim-nan-the-mum.
 Limnoria lignorum, lim-nó'ri-a lig-nó'rum.
 Limoges, lé-mózh'.
 Limousin, lé-moo-san'.
 Limoux, lé-moo'.
 Lindleya, lind-li-a.
 Linea, lé'n-á-a.
 Lingayén, len-ga-yen'.
 Lingen, ling'en.
 Linggi, ling'í.
 Linköping, lin'che-ping.
 Linnæus, lin-né'us.
 Linois, lan-wá'.
 Linsangs, lin'sangz.
 Linz, lints.
 Liotard, lí-ô-tár'.
 Lippe, lip'pa.
 Liqueurs, lí-ker'.
 Lira, lé'ra.
 Lisianthus, lí-si-an'thus.
 Lisieux, lé-zyé'.

Appendix of Pronunciation.

vii

- L'Isle, lél.
Lissochilus, lis-so'ki-lus.
Ljusne, lyoo's'na.
Llama, lyá'ma.
Llanberis, lhan-ber'is.
Llandaff, lhan-daf'.
Llandoverly, lhan-dov'-er-i.
Llandrindod, lhan-drin'-dod.
Llanelly, lhan-eth'lyi.
Llanes, lyá'nes.
Llangollen, lhan-goth'-lyen.
Llanidloes, lhan'id-lois.
Llano Estacado, lyá'no es-ta-ká'do.
Llanquihue, lyan-ké'wá.
Llanrwst, lhan-roost'.
Llerena, lyá-rá'na.
Llewelyn, lhu-el'in.
Llorente, lyó-ren'tá.
Loango, lo-ang'o.
Loasa, ló'sa-a.
Lobachevsky, lo-ba-chev'-ski.
Lobengula, ló-ben-goo'lá.
Lobositz, ló-bo-sits.
Loches, lósh.
Lochmaben, loch-má'ben.
Locle, ló'kl'.
Locusta, lo-koos'ta or lo-kus'ta.
Locus Standi, ló'koos-stan'-di or ló'kus-stan'di.
Lodève, ló-dáv'.
Lodoicea, ló-dó-i-sé'a.
Lodomieria, ló-dó-má'ri-a.
Loess, lss.
Loewe, lé'va.
Lofoten, lo-fó'ten.
Logania, ló-gan'i-a.
Logarithms, log'a-rithmz.
Logau, ló'gau.
Loggia, loj'ji-a.
Logia, ló'gi-a.
Logone, ló-gó'na.
Logroño, lo-gró'nyo.
Lohardaga, lo-har-dug'a.
Loharu, lo-ha-roo'.
Lohengrin, ló'en-grin.
Loigny, lwa-nyí'.
Loire, lwár.
Loire Inferieure, lwár an-fá-ri-er'.
Loiret, lwa-rá'.
Loir-et-Cher, lwar-á-shár'.
Lokeren, lok'er-en.
Lokhvitsa, loch-vit'sa.
Lolos, ló'lož.
Lomaria, ló-má'ri-a.
Lomatia, ló-má'shi-a.
Lomatophyllum, lo-ma-tó-fl'um.
Lom-Palanka, lom-pa-lan'-ka.
Lomza, lom'zha.
Longchamp, lóng-shán'.
Longinus, lom-gé'noos or lon-jí'nus.
Lons-le-Saunier, lon-l'-só-ni-á'.
Lochoo, loo-choo'.
Loofah, loo'fa.
Lope, ló'pá.
Lopez, ló'peth.
Loquat, ló'kwat.
Loranthaceæ, ló-ran-thá'-si-i.
Lorelei, ló'r'-li.
Lorenz, ló-rents'.
L'Orient, ló-ri-an'.
Loriquets, ló-ri-kets'.
Loris-Melikoff, ló'ris-mel'-i-kof'.
Lörrach, ler'aeh.
Lorraine, lór-rán'.
Los Andes, lós-an'dás.
Los Angeles, lós-an'há-lás or lós-an'je-lez.
Los (islands), lós.
Losoncz, lo-shonts'.
Lot, lot or ló.
Lot-et-Garonne, lot-á-ga-rón'.
Lotophagi, ló-tof'a-gi.
Lotze, ló'ts.
Loubet, loo-bá'.
Loughborough, luf'bur'.
Loughrea, loch-rá'.
Louis, loo-i' (Fr.) or loo'is (Eng.).
Louisburg, loo'is-burg.
Louis-d'Or, loo-i-dór'.
Louise, loo-éz'.
Louisade, loo-éz'i-ád'.
Louisville, loo'is-vél.
Loule, loo'lá.
Lourdes, loord.
Lourenço Marques, loo-ren'so mar-kás'.
Louvain, loo-ván'.
Louviers, loo-vi-á'.
Louvre, loo'vr'.
Löwenberg, lé'ven-berg.
Loyola, lo-yó'la.
Lozère, ló-zár'.
Luang-Prabang, loo-ang'-pra-bang'.
Lubao, loo-bá'o.
Lübeck, lü'bek.
Lublin, loo'blin.
Lubni, loob'ni.
Luca della Robbia, loo'ka del'la rob'bi-a.
Luca, look'ka.
Lucena, loo-thá'na.
Lucera, loo-chá'ra.
Lucerne, loo-sern'.
Lucian, loo'si-an.
Lucilius, loo-ké'li-oos or loo-sé'li-us.
Lucina, loo-ké'na or loo-sé'na.
Lücke, lü'ka.
Luckenwalde, look'en-val-da.
Lucknow, luk'nau.
Luçon, lü-son'.
Lucretia, loo-krá'ti-a or loo-kré'sha.
Lucretius, loo-krá'ti-oos or loo-kré'shi-us.
Lucrinus Lacus, loo-kré'-noos lá'koos.
Luculia, loo-kü'li-a.
Lucullus, loo-kool'loos or loo-kul'lus.
Lüdenscheid, lü'den-shit.
Ludhiana, loo-d'-hi-á'na.
Ludinovsk, loo-din-ovsk'.
Ludwig, lood'vig.
Ludwigsburg, lood'vigs-boorg.
Ludwigshafen, lood'vigs-há-fen.
Luganskaya Stanitsa, loo-gan-ská'ya stan-ét'sa.
Lugo, loo'go.
Lugos, loo'gosh.
Luini, loo-é'ni.
Luino (Luvino), loo-s'é'no (loo-vé'no).
Luise, loo-éz'.
Luisia, loo-éz'i-a.
Lule, loo'la.
Luleå, loo'la-o.
Lull (Ramon), lool (ra-món').
Lully, lool'li or lü-li'.
Lunardi, loo-nar'di.
Lunawara, loo-na-wá'ra.
Lunda, loon'da.
Lundenburg, loon'den-boorg.
Lüneburg, lü'na-boorg.
Lunenburg, lün'en-boorg.
Lunerville, lü-na-vél'.
Lung-chou, loong-chau'.
Lupercalia, loo-per-ká'li-a or loo-per-ká'li-a.
Lupulin, loo'pü-lin.
Luray, lur-á'.
Luria, loo'ri-a.
Lusatia (Lausitz), loo-sá'-sha (lau'zits).
Lushai, loo-shí'.
Lusignan, lü-si-nyan'.
Lusitania, loo-si-tá'ni-a or loo-si-'á'ni-a.
Lussin, loos'sin.
Lustrum, loos'troom or lus'trum.
Lutetia Parisiorum, loo-tá'ti-a pa-ré-si-o'room.
Luthardt, loot'hart.
Luther, loo'tár(Ger.) or loo'ther (Eng.).
Lutsk, lootsk.
Luttrinhause, loot'ring-hau-zen.
Lützen, lüt'sen.
Lützw, lüt'so.
Luxembourg, lüks-an-boor'.
Luxemburg, lüks'em-boorg.
Luxeuil, lüks-el' or lus-el'.
Lwynes, lwén.
Luz, lüs.
Luzan, loo-than'.
Luzon, loo-thon'.
Luzula, loo-zü-la.
Luzzati, loo-dzá'ti.
Lwoff, l'uf.
Lycabettus, lü-ka-bet'oos.
Lycanthropy, li-kan'thró-pi.
Lycan, lü-ká'on or li-ká'on.
Lycania, lü-ka-ó'ni-a or li-ka-ó'ni-a.
Lycaste, li-kast'é.
Lychnis, lik'nis.
Lycia, lü'ki-a or lé'shi-a.
Lycium, lis'i-um.
Lycomedes, lü-kó-má'dás or li-kó-mé'déz.
Lycopodon, li-kó-per'don.
Lycophron, lü-kof'rón.
Lycopodium, li-ko-pó'di-um.
Lycorgus, lü-koor'gós or likurgus.
Lydenburg, lü'den-boorg or li'den-burg.
Lydia, lü'di-a.
Lygodium, li-gó'di-um.
Lyme Regis, lim-ré'jia.
Lynceus, lün-ká'ós or lin-sé'us.
Lyonia, li-ó'ni-a.
Lyonnais, li-on-ná'.
Lyons, l'onz.
Lys, lés.
Lysander, lü-san'dár or li-san'dér.
Lysias, lü'si-a or li'si-as.
Lysimachia, li-si-má'ki-a.
Lysimachus, lü-si-má'-choos or li-sim'a-kus.
Lysippus, lü-sip'poos or li-sip'pus.
Lystra, lüs'tra or lis'tra.
Lythraceæ, li-thrá'si-i.
Maastricht, mäs'tricht.
Mabillon, ma-bé-yon'.
Mabington, ma-bin-ó'gi-on.
Mably, ma-blé'.
Mabuse (Jan), ma-büz'(yan).
Macedonia, ma-ká-dó'ni-a or ma-se-dó'ni-a.
Maceis, ma-sás'.
Macerata, ma-chá-rá'ta.
Machærodus, ma-ké-ro-dus.
Machia-velli, ma-ki-a-vel'i.
Mackaya, ma-ki'a.
Mackonochie, ma-kon'ó-chi.
Macleod, mak-laud'.
Macon, má-kon'.
Macrinus, ma-cré'noos or ma-kri-nus.
Macrozamia, ma-kro-zá-mi-a.
Madava Rao, ma-dá'va-rá'o.
Madeira, ma-dá'ra or ma-dé'ra.
Madhava Acharya, má'dha-va-a-chár'ya.
Madhu Sudan Datta, má'dhoo soo'dun dat'ta.
Madridejos, má-dri-dá'hós.
Mæander, má-an'dár or mé-an'dér (Gr. mi'an-dros).
Mæcenus, má-ká'nas or mé-sé'nas.
Maelström, mäl'strem or mäl'strum.
Maerlant, mäl'rant.
Maeterlinck, mé'tér-link.
Mafeking, mäf'king.
Maffei, maf-fá'i.

Magadha, mǎ'ga-d'ha.
 Magallanes, ma-ga-lyá'nás.
 Magdala, mǎg'da-lá.
 Magdalena, mag-da-lá'na.
 Magdeburg, mǎg'da-boorg.
 Magellan, ma-gel-yán' or ma-gel'lan.
 Maggiore, maj-jó'rá.
 Magilus, maj'il-us.
 Magister equitum, ma-gis-ter é'qui-toom or maj-is-ter é'qui-tum.
 Magliabechi, ma-lyá-bek'i.
 Magna Charta, mǎg'na kár'ta or mǎg'na char'ta.
 Magnesite, mǎg'ne-zit.
 Magnificat, mǎg-nif'i-kat.
 Magnús, mǎg'noos.
 Magyars, mod-yors' or mag-yárz'.
 Mahabaleshwar, ma-há-bul-es'h-war'.
 Mahabalipur, ma-há-bul-i-poor'.
 Mahabharata, ma-há-b'há'-ra-ta.
 Mahanadi, ma-há-nud'i.
 Mahanaim, ma-ha-ná'em or ma-ha-ná'im.
 Mahanoy, má-ha-noi'.
 Maharajsnagar, ma-há-ráj'-nug-ur.
 Mahavansa, ma-há-van'sa.
 Mahavira, ma-há-vé'ra.
 Mahdi, mah'di.
 Mahé, má-á.
 Mahikantha, ma-hé-kán'-t'ha.
 Mahim, ma-hém'.
 Mahmud, mah-mood'.
 Mahures, ma-hoo'ri-a.
 Mahuwa, ma-hoo'wa.
 Mai, mǎi.
 Mala, mǎ'a.
 Malkop, mǎ'kop.
 Maimachin, mǎi-má'chin.
 Maimansingh, mǎi-mun-sing'.
 Maimbourg, mǎim-boor'.
 Maimon, mǎi'môn.
 Maimonides, mǎi-mon'i-déz or mǎi-mon'i-dás.
 Main, mǎin.
 Maine-et-Loire, mǎn-á-lwár'.
 Mainots, mǎi'nots.
 Mainpuri, mǎin-poo'ri.
 Maintenon, mǎin-t'non'.
 Mainz, mǎints.
 Maioroscú, mǎi-ó'shoo.
 Mairia, má'ri-a.
 Maistre, mǎis'tr'.
 Maiwand, mǎi'wand.
 Majolica, ma-yol'i-ka.
 Majorca (Mallorca), ma-jór'ka (ma-lyor'ka).

Majuba, ma-yoo'ba or ma-joo'ba.
 Majunga, ma-joon'ga.
 Makaroff, ma-kar-of'.
 Makkari, mak'ka-ri.
 Mako, mo-ko'.
 Makololos, ma-ko-ló'loz.
 Makrizi, ma-kré'zi.
 Malabari, ma-la-bá'ri.
 Malachi, mal-á-ké' or mal'-a-ki.
 Malachite, mal'a-kit.
 Malachy, mal'a-ki.
 Malacopterygii, ma-la-kop-ter-ij'i-i.
 Malacostraca, ma-la-kos'-tra-ka.
 Malakoff, ma-la-kof' (Fr.) or mal-a-kof (Eng.).
 Malan, ma-lan'.
 Malapterurus, mal-ap-te-rú rus.
 Mälar, má'lar.
 Malatia, ma-la-té'ya.
 Malchin, mal'chin.
 Maldegheem, mal'd'-gem.
 Maldonado, mal-do-ná'do.
 Mallebranche, mal-bran'sh'.
 Maler Kotla, ma-lur-kot'-la.
 Malesherbes, mal-zerb'.
 Malerbo, ma-lerb'.
 Malibran, ma-li-bran'.
 Malines, ma-lén'.
 Mallarmé, ma-yar-má'.
 Malleability, mal-i-a-bil'-i-ti.
 Malmaison, mal-má-zon'.
 Malmesbury, mǎmz'b'-ri or mǎmz'bury.
 Malmö, malm'.
 Malmsey, mǎm zi.
 Malmström, malm'strem.
 Malope, mal'op-é.
 Malpighi, mal-pé'gi.
 Malpighia, mal-pé'gi-a.
 Malplaquet, mal-pla-ká'.
 Malstatt-Burbach, mal'-stat-boor-bach'.
 Maltebrun, mǎlt-brun'.
 Malvaceæ, mal-vá'si-i.
 Malvastrium, mal-vas'-trum.
 Mamelukes, mam'é-lüks.
 Mammers, ma-mär'.
 Mamiani della Rovere, ma-mi-á'ni dell'a ró-vá-rá.
 Mamilius, ma-mil'i-ooos or ma-mil'i-us.
 Mammea, mam'mi-a.
 Mammillaria, mam-mil-lá'-ri-a.
 Mamore, ma-mo-rá'.
 Manacor, ma-na-kór'.
 Managua, ma-ná'gwa.
 Manaoag, ma-na-ó'ag.
 Manaoas, ma-ná'ós.

Manasarowar, ma-na-sa-ró-wár'.
 Manasseh, m'-nash-á' or ma-nas'sá.
 Manatee, man-a-té'.
 Manbhum, man-b'hoom'.
 Manche, mǎnsh.
 Manchineel, man-chi-nél'.
 Manchuria, man-choo'ri-a.
 Mancini, man-ché'ni.
 Mandæans, man-dé'anz.
 Mandalay, man-dá-lá.
 Mandamus, man-dá'moos or man-dá'mus.
 Mandaue, man-dau'á.
 Mandeville, man'de-vél.
 Mandingans, man-ding'-anz.
 Mandla, man'dla.
 Mandogari, man-dō-gur'.
 Mandsaur, mund-saur'.
 Manduria, man-doo'ri-a.
 Mandvi, mand'vi.
 Manes, má'nás or má'néz.
 Manet, má-ná'.
 Manetho, ma-ná'tho or ma-né'tho.
 Manettia, ma-net'ti-a.
 Manfredonia, man-fre-dó'ni-a.
 Mangalore, mang-a-lór'.
 Mangishlak, man-gish-lák'.
 Manglaur, mang-lár'.
 Mangonel, mang'ō-nel.
 Mangosteën, mang'ō-stēn.
 Manichæism, man'j-kē-ism.
 Manihiki, man-i-hé'ki.
 Manihot, man'i-hot.
 Manikaland, man'i-ka-land or ma-nik'a-land.
 Manilius, ma-nil'i-ooos or ma-nil-i-us.
 Manipur, man-i-poor'.
 Manitoba, man-i-tó'bá or man-i-tó'bá'.
 Manitou, man'i-too.
 Manitoulin, man-i-too'lin or man-i-too'lén.
 Manilus, man'li-ooos or man'-li-us.
 Mannargudi, mun-nár'-gud-i.
 Mannheim, man'him.
 Manresa, man-rá'sa.
 Manrique, man-ré'ká.
 Mans, mǎn.
 Mansurah, man-soo'ra.
 Mantegna, man-té'nya.
 Mantes, mant.
 Manteuffel, man-toi'fel.
 Mantinea, man-ti-ná'a or man-ti-né'a.
 Mantras, man'tras.
 Mantua (Mantova), man-tú-a (mā-to'va).
 Manu, má'noo.

Manutius Aldus, ma-noo'-ti-ooos al'doos.
 Manzanares, man-than-á'-rás.
 Manzanillo, man-than-i'lyo.
 Manzanita, man-zan-é'ta.
 Manzoni, man-tsó'ni.
 Maori, má-ó'ri or má-ó'ri (Eng.).
 Maqui, má'ki.
 Marabouts, ma-ra-boots'.
 Maracaibo, ma-ra-ki'bo.
 Maracci, ma-rach'ché.
 Maragha, má'ra-ga.
 Maragogipe, ma-ra-go-zhé'-pá.
 Marajo, ma-ra-zho'.
 Maramaros Szighet, mar'-om-or-osh sé'get.
 Maranhão, ma-ra-nyan'.
 Marano di Napoli, ma-rá'-no di ná'po-li.
 Maraschino, ma-ras-ké'no.
 Marasmus, ma-raz'mi-us.
 Marat, má-rá'.
 Maratha, má-rá't'ha.
 Maravedi, ma-ra-vá'di.
 Marcabrun, mar-ka-brun'.
 Marcantonio, mar-kan-tó'-ni-o.
 Marceau, mar-só'.
 Marcello, mar-ché'lo.
 Marcet, mar-sá'.
 Marchantia, mar-kan'ti-a.
 Marchesi, mar-ká'si.
 Marchetti, mar-ket'ti.
 Marchfeld, march'felt.
 Marchienne-au-Pont, mar-shi-en'-o-pōn'.
 Marcialise, mar-cha-né'sá.
 Marcomanni, mar-ko-mán'i.
 Marconi, mar-kó'ni.
 Mardin, mar-dén'.
 Marenzio, ma-ren'tsi-o.
 Margaux, mar-gó'.
 Marggraf, mar'graf.
 Margrave, mar'gráv.
 Margyricarpus, mar-jir-i-kar'pus.
 Marheineke, mar-hin'a-ka.
 Mariazell, ma-ré'a-tsel.
 Marie de' Medici, má-ré'de med'i-chi.
 Marienbad, ma-ré'en-bát.
 Marienburg, ma-ré'en-boorg.
 Marienwerder, ma-ré'en-ver-der.
 Mariette, má-ri-et'.
 Marigliano, ma-ri-lyá'no.
 Marignac, má-ri-nyak'.
 Marindouque, ma-rin-doo'-ká.
 Marius, má'ri-ooos or má'ri-us.
 Mariut, ma-ri-oot'.
 Marivaux, ma-ri-vó'.

